Modular Reconfigurable C4I Interface (MRCI) Phase 1

Demonstration of Operational Capability (DOC)

19 February 1997

DOC Agenda (1 of 2)

Time	*Subject*	*Briefer*
0830-0840	**Welcome / Introductions**	**Mark Cosby**
0840-1040	**Status of Experimental Federation Elements**	
	- RTI F.0	**Mike Hieb**
	- RTI S.X	**Mike Hieb**
	- C4I/CTAPS	**Bill Bretton**
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	- SIM/CCTT	**Rick McKenzie**
	- SIM/CBS	**Jerry Hill**
	- TEST CELL/TOOLS	**Larry Griggs**
	- COMM EFFECTS SERVER (CES)	**Aaron Steigerwald**
	- MRCI	**Mark Cosby**

DOC Agenda (2 of 2)

Time	*Subject*	*Briefer*
1040-1050	**Break**	
1050-1150	**Demonstration of MRCI Operational Capability**	**Larry Griggs** **Mike Hieb**
	- CTAPS, MCS/P, AFATDS, ARSAF,CCTT TEST TOOLS, CES	
1150-1205	**Inter-Program Activities Status**	
	- STOW	**John Zwirner**
	- JSIMS	**Mike Lightner**
	- JTC	**Laura Feinerman**
1205-1225	**MRCI Software Quality Factors**	
	- Overview of Quality Factors	**Larry Griggs**
	- Emphasis on Reusability	**Mike Hieb**
1225-1230	**IPR Overview**	**John Park**
1230	**Adjourn**	

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RTI F

- **Status:** RTI F.0 has been released. This provides a core set of run-time services for the main RTI service catagories described in the HLA Interface Specification version 1.0.
- **Schedule:** RTI F will be updated in April 1997. Future releases of RTI F will provide run-time services for all catagories described in the HLA Interface Specification version 1.0.
- **For Use In MRCI Experiments:** HLA C2
- **Contact:** http://www.dmso.mil/projects/hla
- **Services Implemented in RTI F.0:**

  Federation Management
  Declaration Management
  Object Management
  Ownership Management
  Time Management
  RTI Support Services

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RTI S

- **Status:** RTI S, Version B has been released. This adds data distribution service in the form of routing spaces.
- **Schedule:** RTI S, Version C is scheduled for release 24 March 1997. It will add Guaranteed IDs, a Consistency Protocol and divide the RID file into a FED (Federation Execution Definition) file for FOM items and a RID file for RTI specific details.
- **For Use In MRCI Experiments:** STOW97
- **Contact:** http://dss.ll.mit.edu/rit-s.html
- **Services Implemented in RTI S, B & C:**

Limited Federation Management
Declaration Management
Object Management
Data Distribution Management
Misc. Support Services

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C4I Federate
CTAPS Baseline (1 of 2)

- **Developer:** Multiple (Integrator - Lockheed Martin)
- **Sponsoring Government Agency:** ESC/AVB
- **Brief Description of C4I System:** CTAPS provides the USAF with force level (AOC) automation in planning and executing the theater air campaign
- **For Use In MRCI Experiments:** STOW97 and DMSO/JSIMS HLA C2 Experiments
- **Simulations Interfaced to in MRCI Experiments:** STOW - AFSAF via aWOC to SOAR and AFIT Air Base Model, HLA C2 - NASM-AP
- **H/W & S/W Supported:** Sun Sparcs, SunOs 4.1.4
- **Status:** CTAPS Version 5.1.3 currently fielded and will be the version used in the STOW and HLA C2 tests. CTAPS 5.2 due out in March 97. CTAPS will be replaced by TBMCS V1.0 in mid-late 98.

C4I Federate
CTAPS Baseline (2 of 2)

USMTF Messages Used by CTAPS for MRCI Experiments

ATO - Air Tasking Order

ACO - Airspace Control Order

TACREP - Tactical Report

MISREP - Mission Report

ABSTAT - Air Base Status Report

COMSITREP - Commander's Situation Report

LOGSITREP - Logistics Situation Report

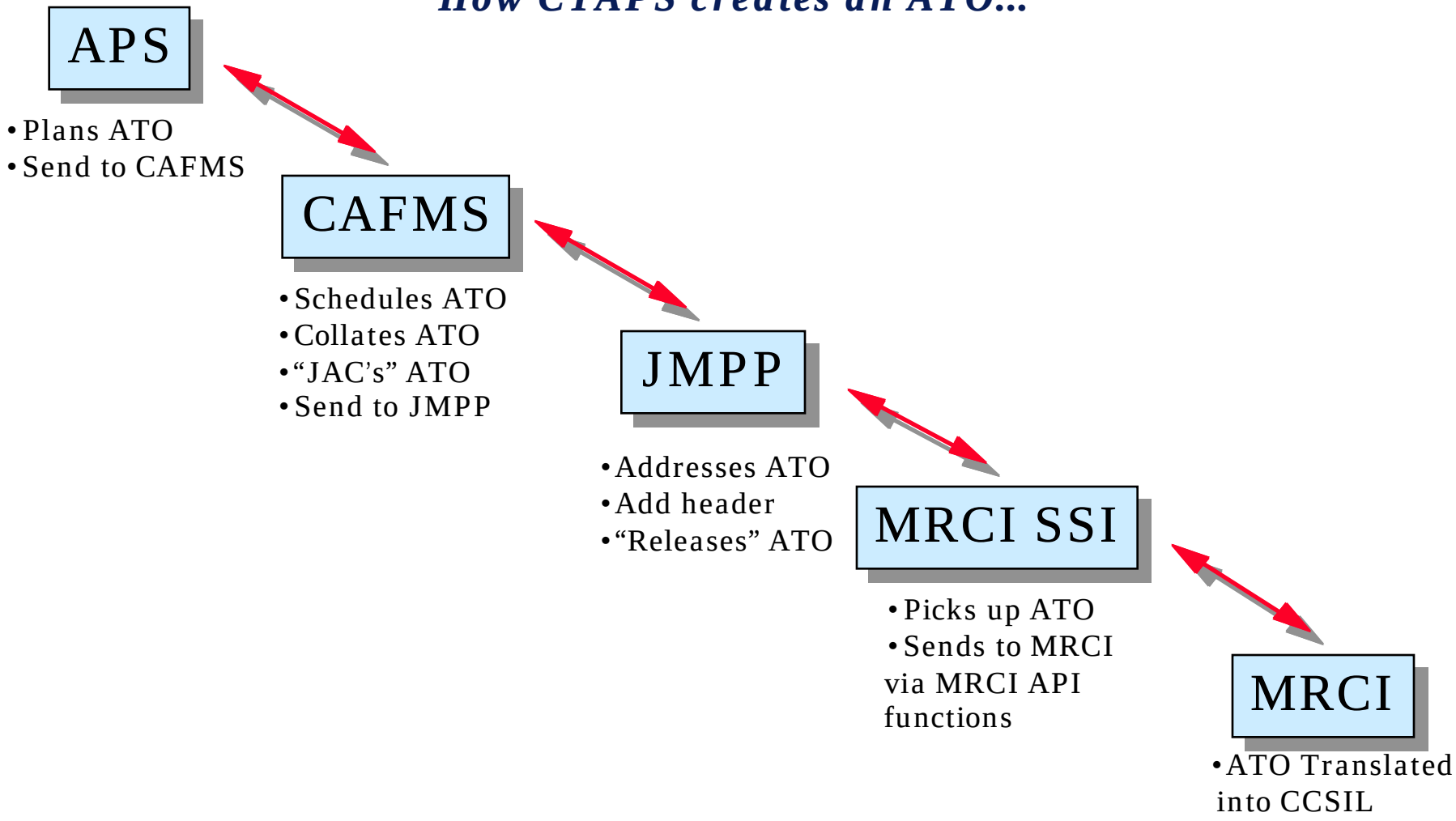
CTAPS/MRCI System Specific Interface (SSI)

What it does...

- **The CTAPS SSI shall:**
  - Interface using existing CTAPS communication methods
  - Not affect the normal operation of the CTAPS
  - Interface with MRCI using only MRCI API functions
  - Receive USMTF messages from MRCI
  - Transmit USMTF messages to MRCI
  - Perform transmit and receive functions automatically

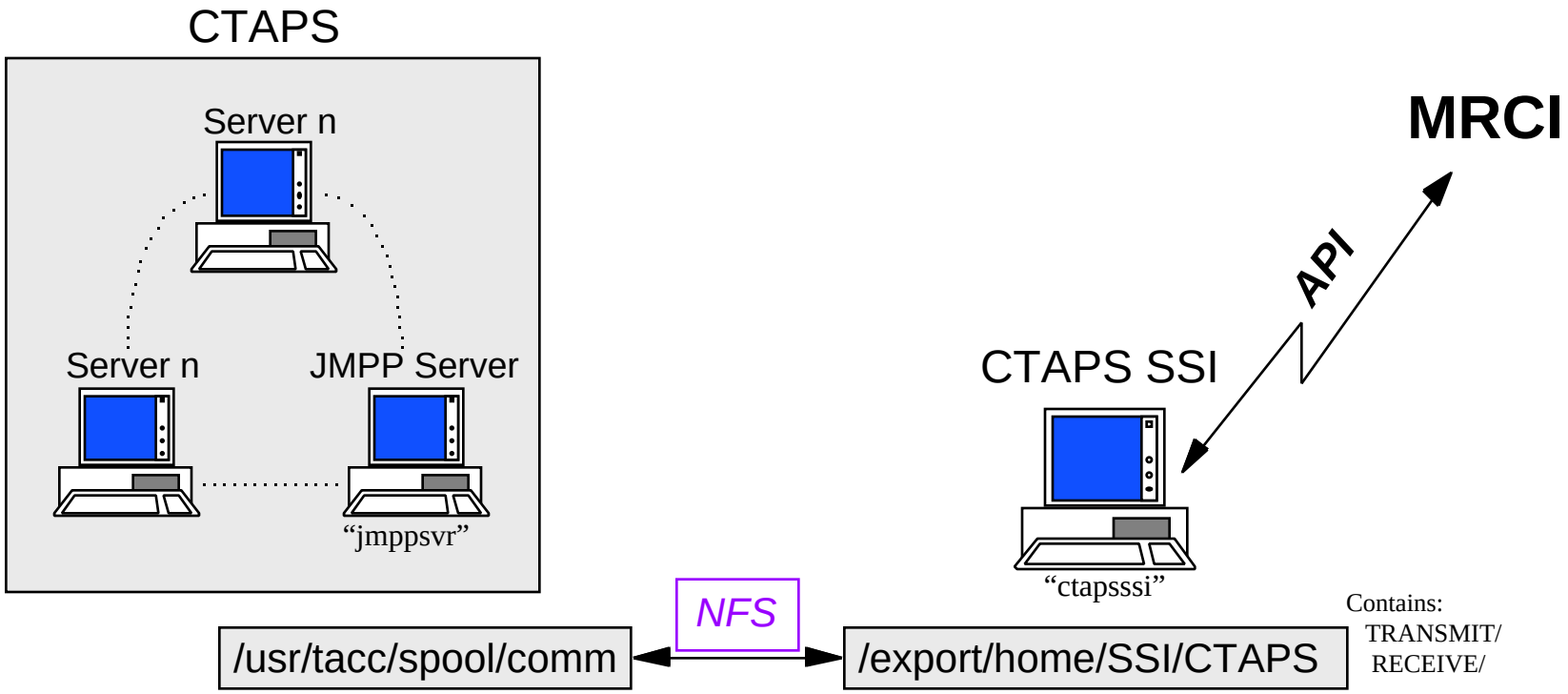
CTAPS/MRCI System Specific Interface (SSI)

How CTAPS creates an ATO...



CTAPS/MRCI System Specific Interface (SSI)

How it is set up...



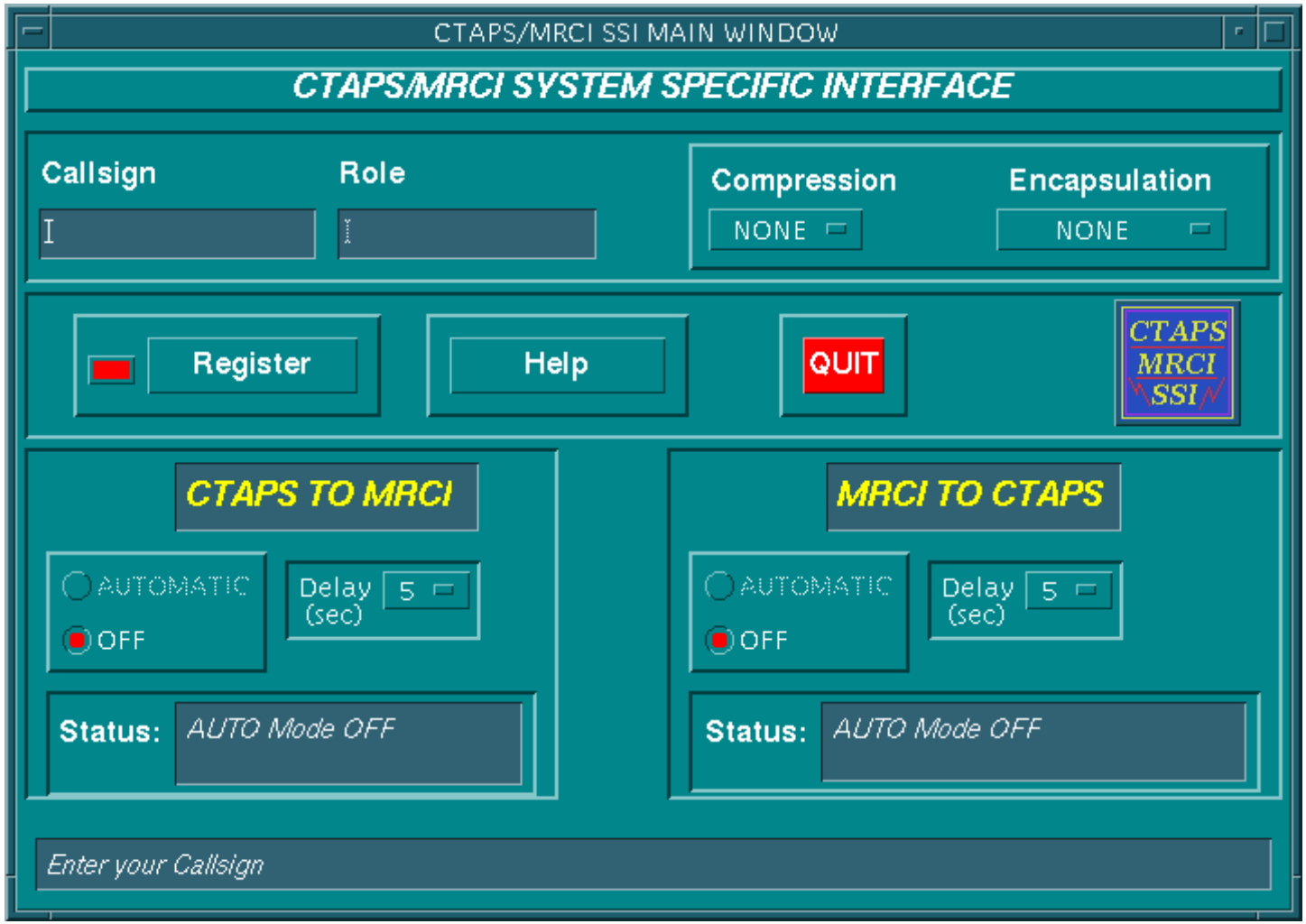
mount ctapsssi:/export/home/SSI/CTAPS /usr/tacc/spool/comm

share /export/home/SSI/CTAPS rw=jmppsvr,root=jmppsvr

ENV vars:
FROM_CTAPS_DIR = /export/home/SSI/CTAPS/TRANSMIT
TO_CTAPS_DIR = /export/home/SSI/CTAPS/RECEIVE
ARCHIVE_DIR = /export/home/SSI/ARCHIVE

CTAPS/MRCI System Specific Interface (SSI)

What it looks like...



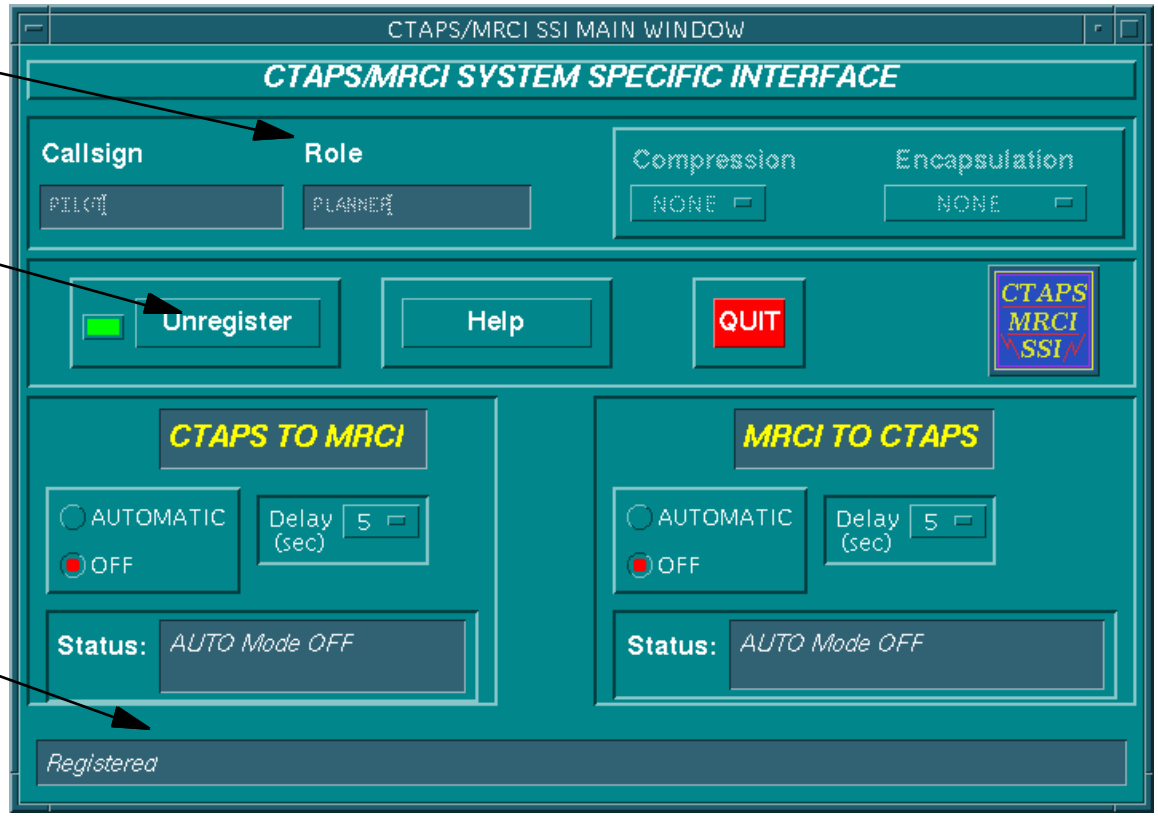
CTAPS/MRCI System Specific Interface (SSI)

How it works...

Type in Callsign and Role

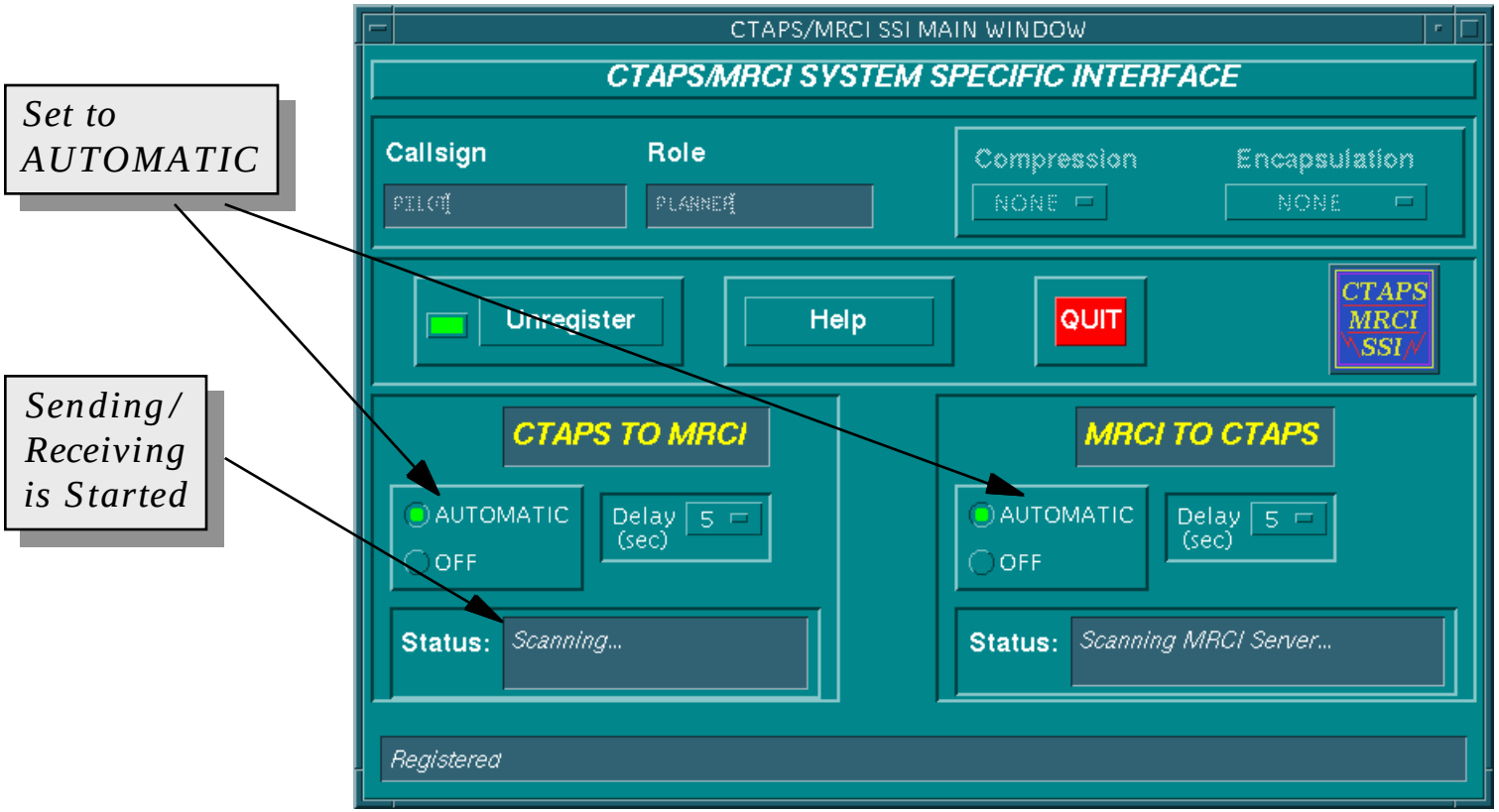
Press Register Button

You're Registered!



CTAPS/MRCI System Specific Interface (SSI)

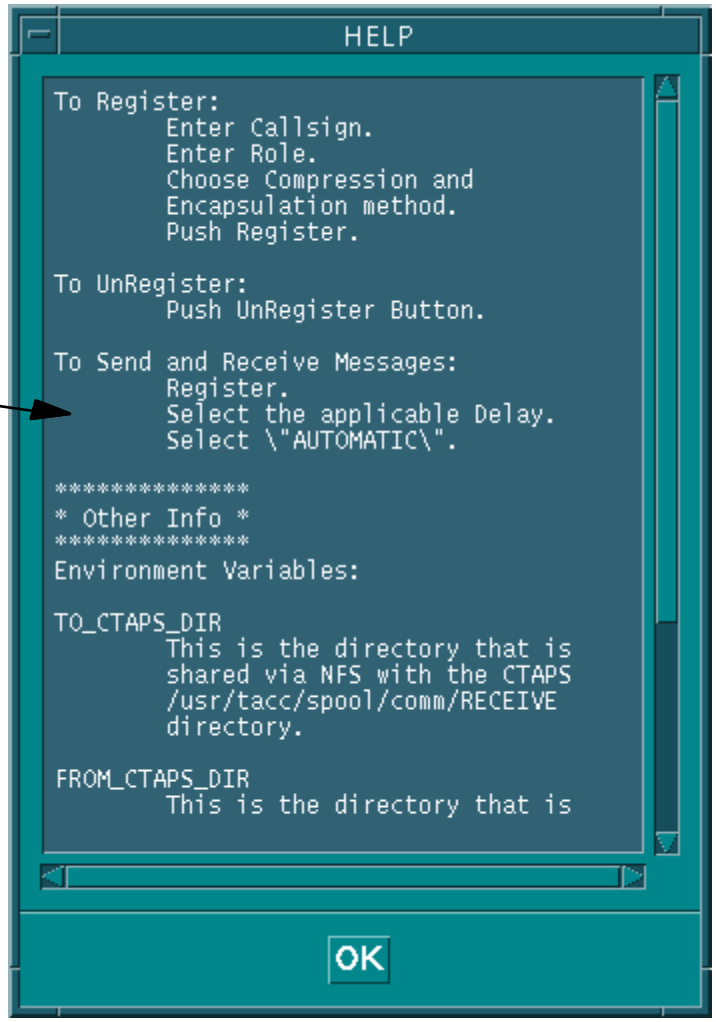
How it works...



CTAPS/MRCI System Specific Interface (SSI)

How you get help...

The HELP Button on the Main Form displays the Help Screen



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Simulation Federate AFSAF (1 of 2)

- **Developer:** University of Michigan for SOAR & aWOC, Air Force Institute of Technology for the Airbase Model
- **Sponsoring Government Agency:** DARPA, ESC/AVM (PM)
- **Brief Description of Simulation**: AFSAF is an integration of SOAR/IFOR for simulation of pilots and ModSAF for providing an aircraft simulation capability. An Automated Wing Operations Center (aWOC) is used to manage and route communications among an existing AFIT airbase model, AFSAF and CTAPS
- **For Use In:** STOW97
- **C4I System Interfaced To:** CTAPS
- **H/W & S/W Supported:** SGI & IRIX
- **Status:** AFSAF SOAR/IFOR has participated in STOW-E and STOW97 combined tests and is adding new pilot behaviors. The Base Model has been rehosted to a workstation environment (in FORTRAN). The aWOC is under development and was delivered to MRCI testing in January 1997.

Simulation Federate AFSAF (2 of 2)

CCSIL Messages

ATO (#1500)

ACO (#1501)

Mission Status Report - (ETD, ETA) (#1700)

Mission Status Report - (ATD, ATA) (#1701)

Mission Deviation Report (#1702)

Air Base Status Report (#1703)

Commander's SITREP (#1704)

Log SITREP (#1705)

Base Incident Report Status Report (#1706)

Air Mission Report (#1707)

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C4I Federate
MCS/P Baseline

- **Developer:** CSC
- **Sponsoring Government Agency:** PM Operations Tactical Data Systems (PM OPTADS)
- **Brief Description of C4I System:** MCS/P provides an Army Commander with battlefield situation awareness from battalion through corps via the current situation map and unit resource data. This information, which is distributed throughout the battlefield between MCS/P workstations, provides commanders and staffs at all tactical echelons with timely, current information.
- **For Use In MRCI Experiments:** DMSO/JSIMS HLA C2 Experiments, STOW97, ALSP Confederation Test 97 (CT97), Prairie Warrior 97 (PW97)
- **Simulations Interfaced to in MRCI Experiments:** ARSAF, CCTT, CBS, Eagle
- **H/W & S/W Supported:** CHS-2 Sun Sparc workstation, Solaris 2.4, Informix 7.12, COE Maps & Overlays, COE Comm Message Processor
- **Status:** MCS/P Baseline supports tactical operations at command posts from battalion through corps, and is currently being issued to III US Corps and the TRADOC schools and centers.

C4I Federate MCS/P Baseline

USMTF Message Set Used by MCS/P for MRCI Experiments

C400 SITREP

A423 Operations Order

ATCCS Message Set Used by MCS/P for MRCI Experiments

S201 Geometry Message

S302 Free Text Message

S309 Enemy Interoperability Message

E500 Air Strike Warning

S507L Resources Location (Unit Loc Data)

S507R Resources Resources (Unit Resources Data)

S507S Resources Supply (Supply Point Data)

S509 Commander's Tracked Item List

MCS/P Baseline SSI

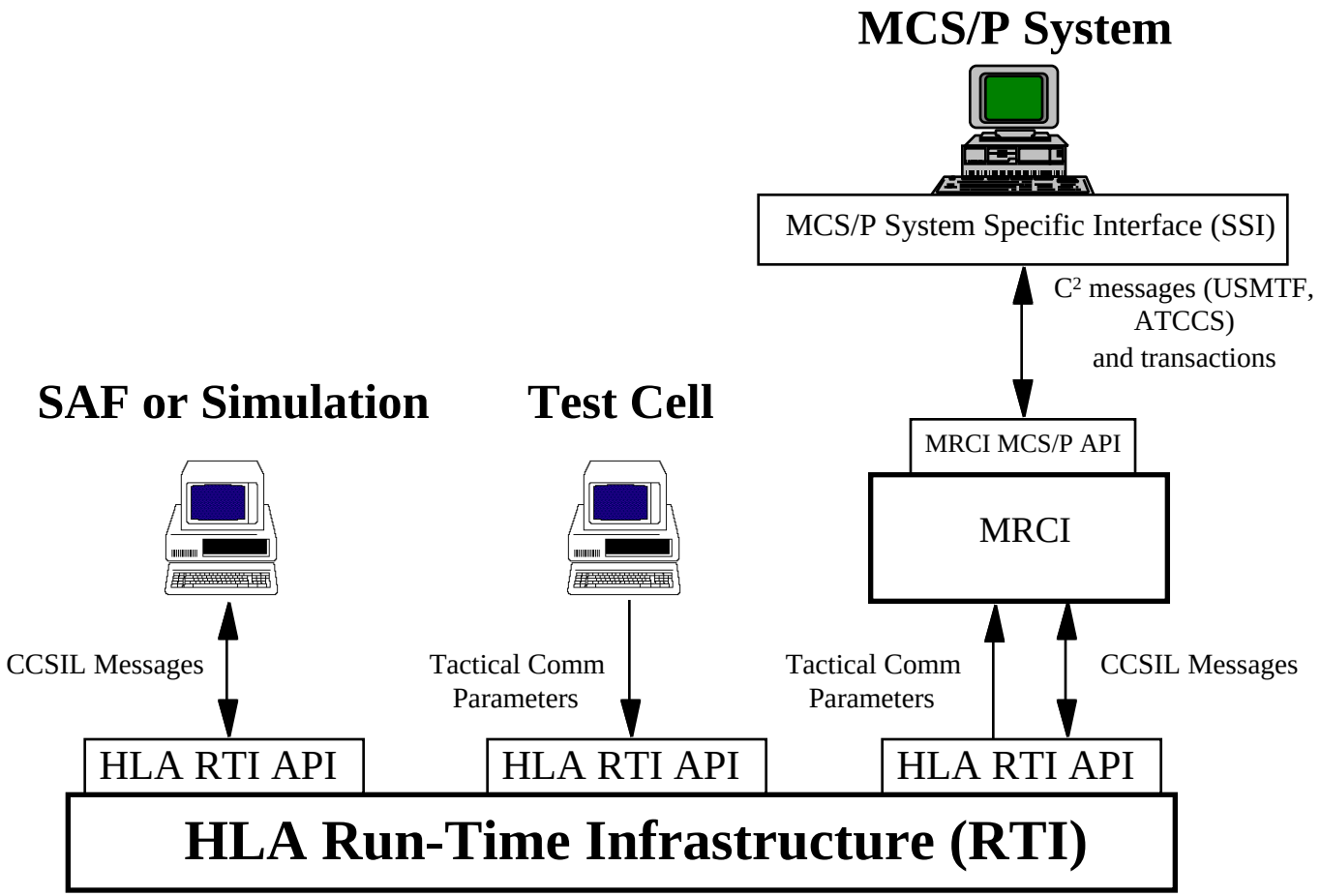
- **Current Capability**
  - Enqueue messages to MRCI
  - Dequeue messages from MRCI
  - GUI interface with command line option
  - Logging and error trapping routines
  - Integrated into MCS/P as an application
  - Operates concurrently with standard MCS/P messaging software

MCS/P Baseline SSI

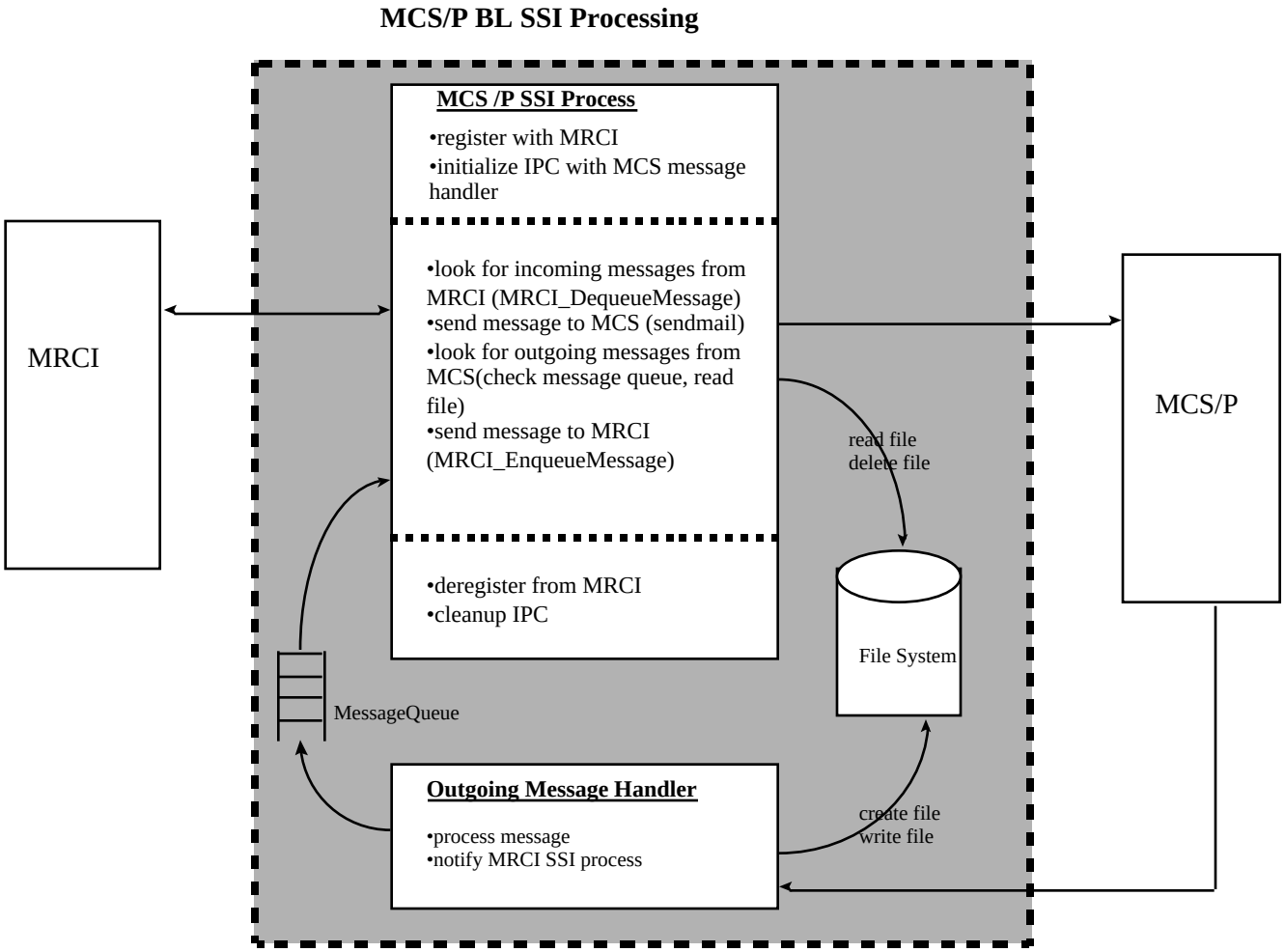
- **Current Schedule Status**
  - Build 1: Dequeue *Completed 12/10/96*
  - Build 2: Enqueue *Completed 1/15/97*
  - Build 3: GUI, Exception Handling, Logs *Completed 2/14/97*

- **Efforts continue to refine software and enhance error handling**

MCS/P SSI Architecture



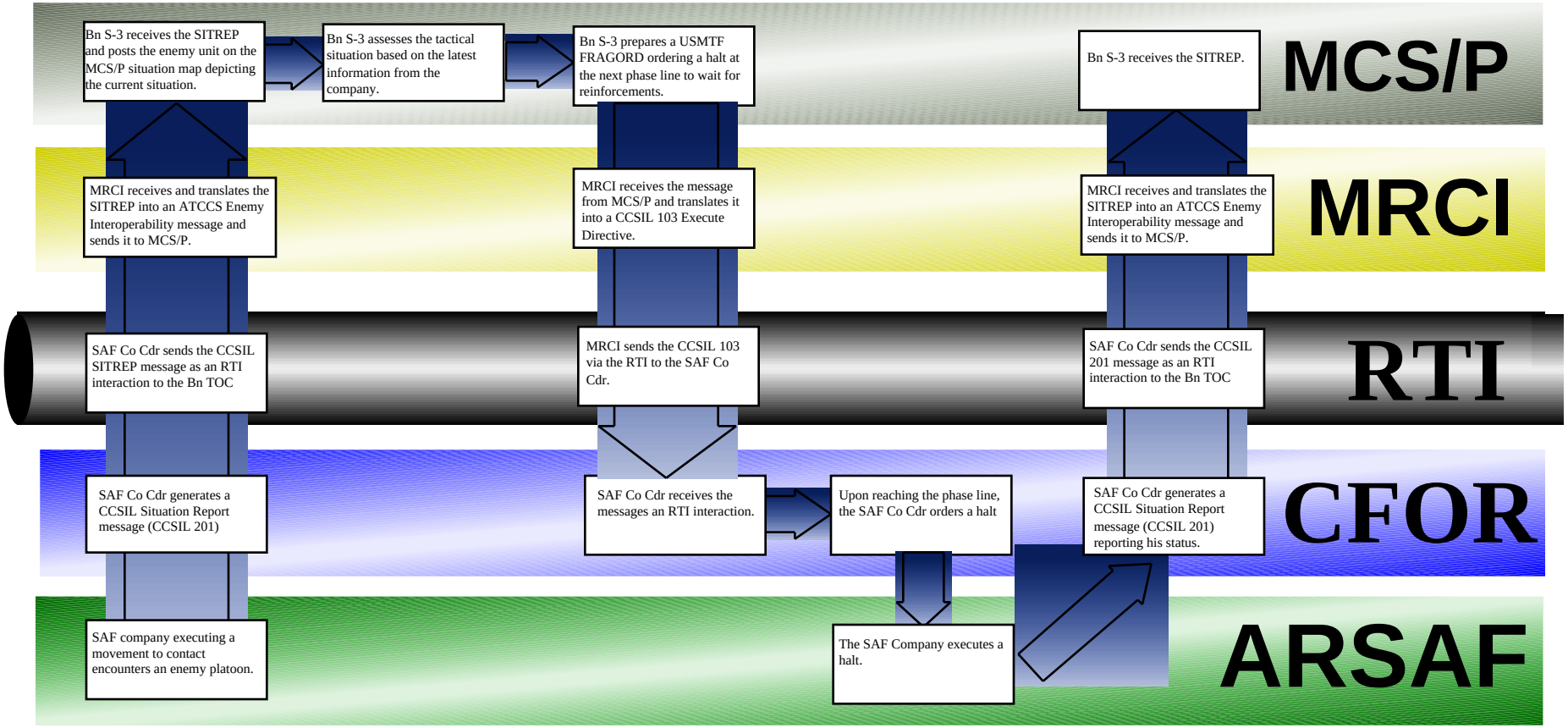
MCS/P SSI Design



MCS/P Message Flow

- **Outbound**
  - => MCS/P Message Handler
  - => Outbound Message Queue
  - => Identify MRCI Messages
  - => Send Message to MRCI Enqueue Function
- **Inbound**
  - => Check MRCI SSI Dequeue
  - => Read Message
  - => Forward Message to MCS (Sendmail)
  - => Process as Normal USMTF/ATCCS Message

MCS/P - ARSAF Message Interaction



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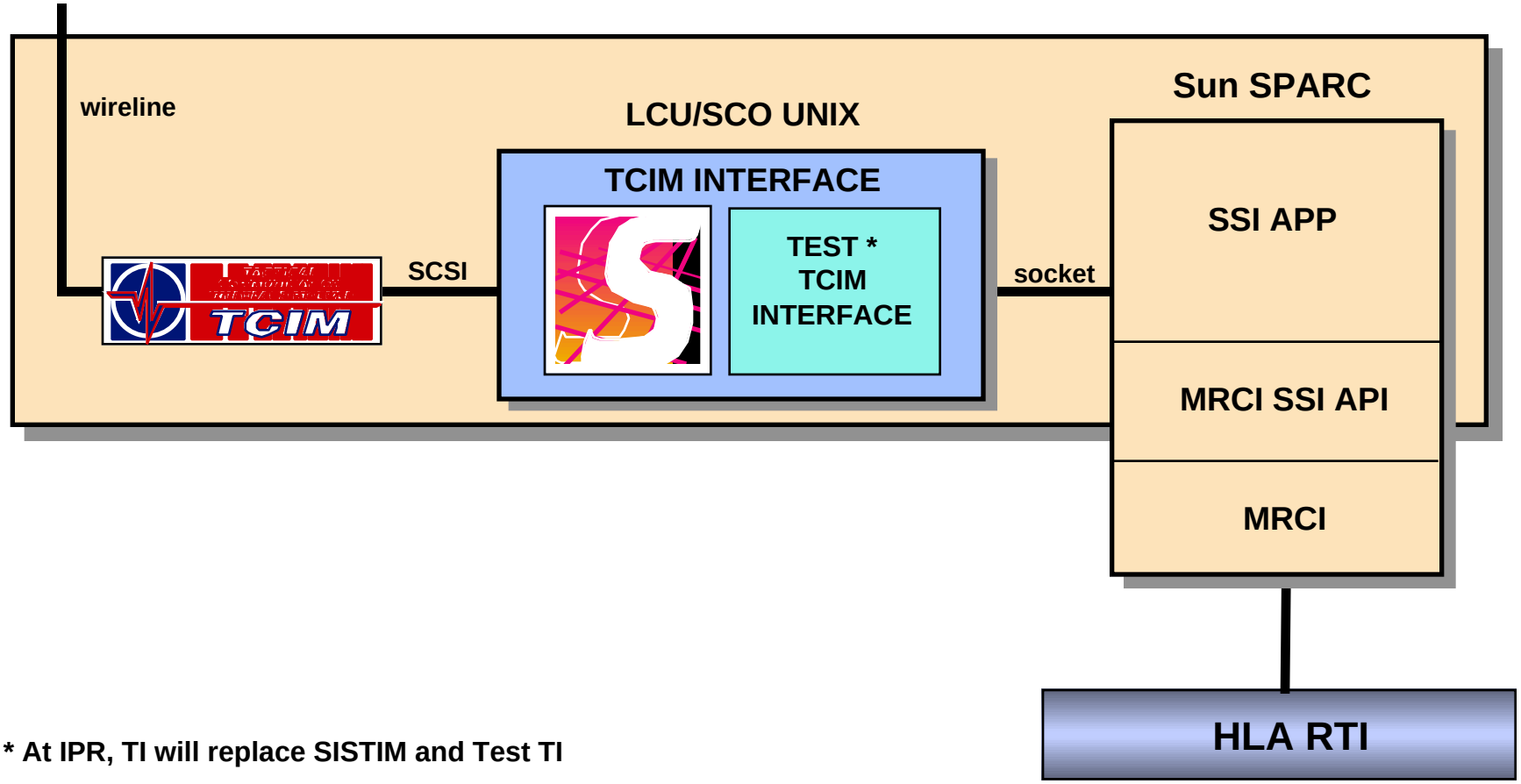
C4I Federate AFATDS (1 of 6)

- **Developer:** Hughes Defense Communications
- **Sponsoring Government Agency:** CECOM
- **Brief Description of C4I System:** AFATDS provides the Army Commander with a fully integrated and automated fire support command and control system for the total force from platoon to corps.
- **For Use In MRCI Experiments:** DMSO/JSIMS HLA C2 Experiments, STOW97, ALSP Confederation Test 97 (CT97), Prairie Warrior 97 (PW97)
- **Simulations Interfaced to in MRCI Experiments:** ARSAF, CCTT, CBS, Eagle
- **H/W & S/W Supported:** Sun SPARC Solaris 2.x, SCO UNIX ODT 3.0
- **Status:** AFATDS '96 is currently fielded with AFATDS '97 following shortly

C4I Federate AFATDS (2 of 6)

MRCI–AFATDS SSI

DOC CONFIGURATION



*** At IPR, TI will replace SISTIM and Test TI**

C4I Federate AFATDS (3 of 6)

- **Current Functional Capability**
  - SSI APP on SPARC
    - Makes all MRCI API calls (Reg, UnReg, Enque, Deque)
  - Test TCIM Interface & SISTIM on LCU
    - Test TI provides connectivity to SSI APP
    - SISTIM provides connectivity to AFATDS
    - Replaced at IPR with operational TI on LCU
  - AFATDS on HP735 w/TCIM

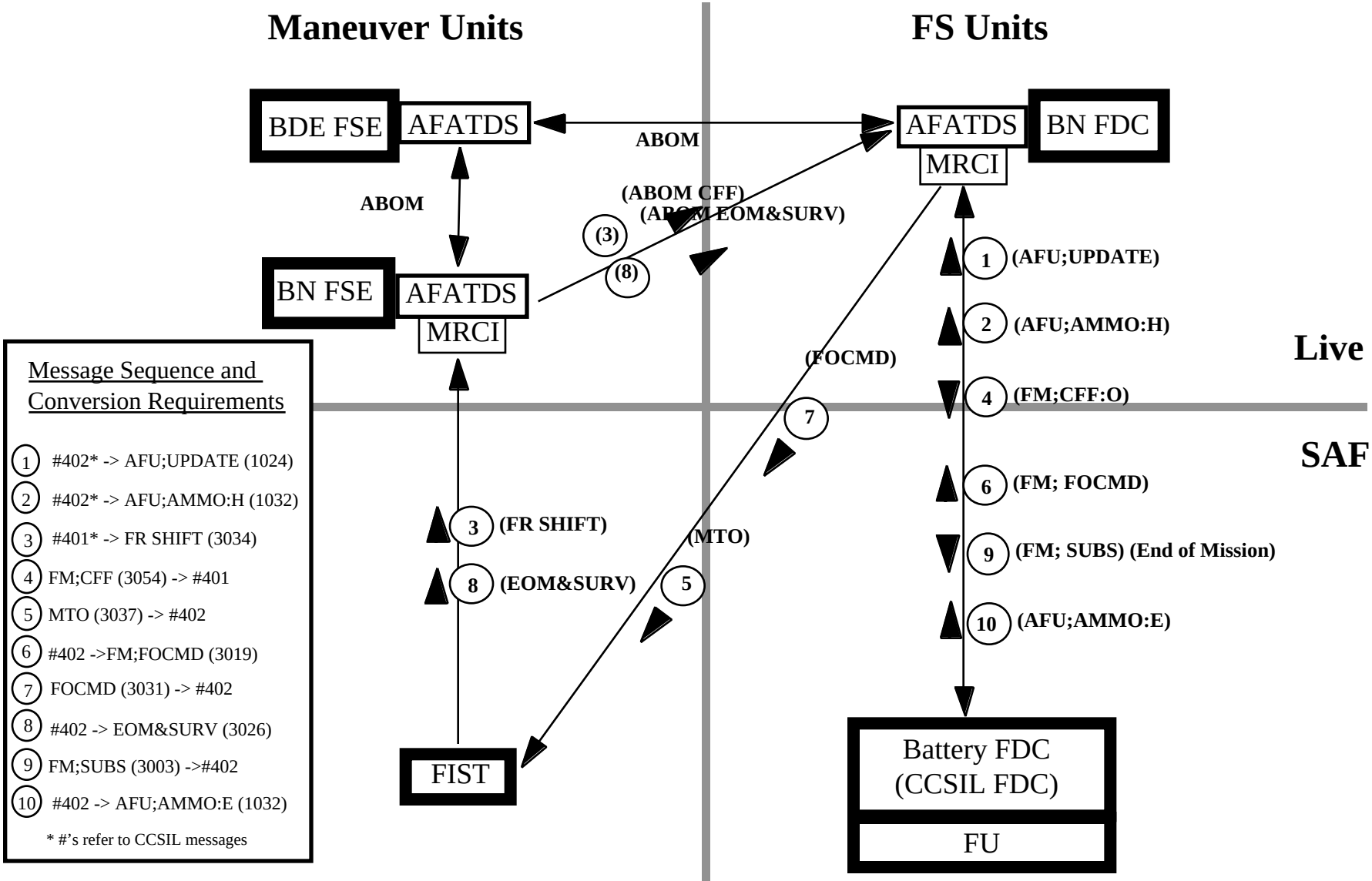
C4I Federate AFATDS (4 of 6)

- **Schedule Status**
  - On schedule to demonstrate operational capability at IPR
- **Points of Contact**:

Mike Bendall	219.429.4635	mlbend@most.fw.hac.com
Dale Anglin	219.429.5677	deangl@most.fw.hac.com
Mark Flanagan	219.429.7093	mjflan@most.fw.hac.com
Dave Walker	219.429.4113	dmwalk@most.fw.hac.com
Jess Voirol	219.429.5954	jrvoir@most.fw.hac.com

C4I Federate AFATDS (5 of 6)

AFATDS Message Interaction



MRCI Demonstration of Operational Capability - 19 February 1997

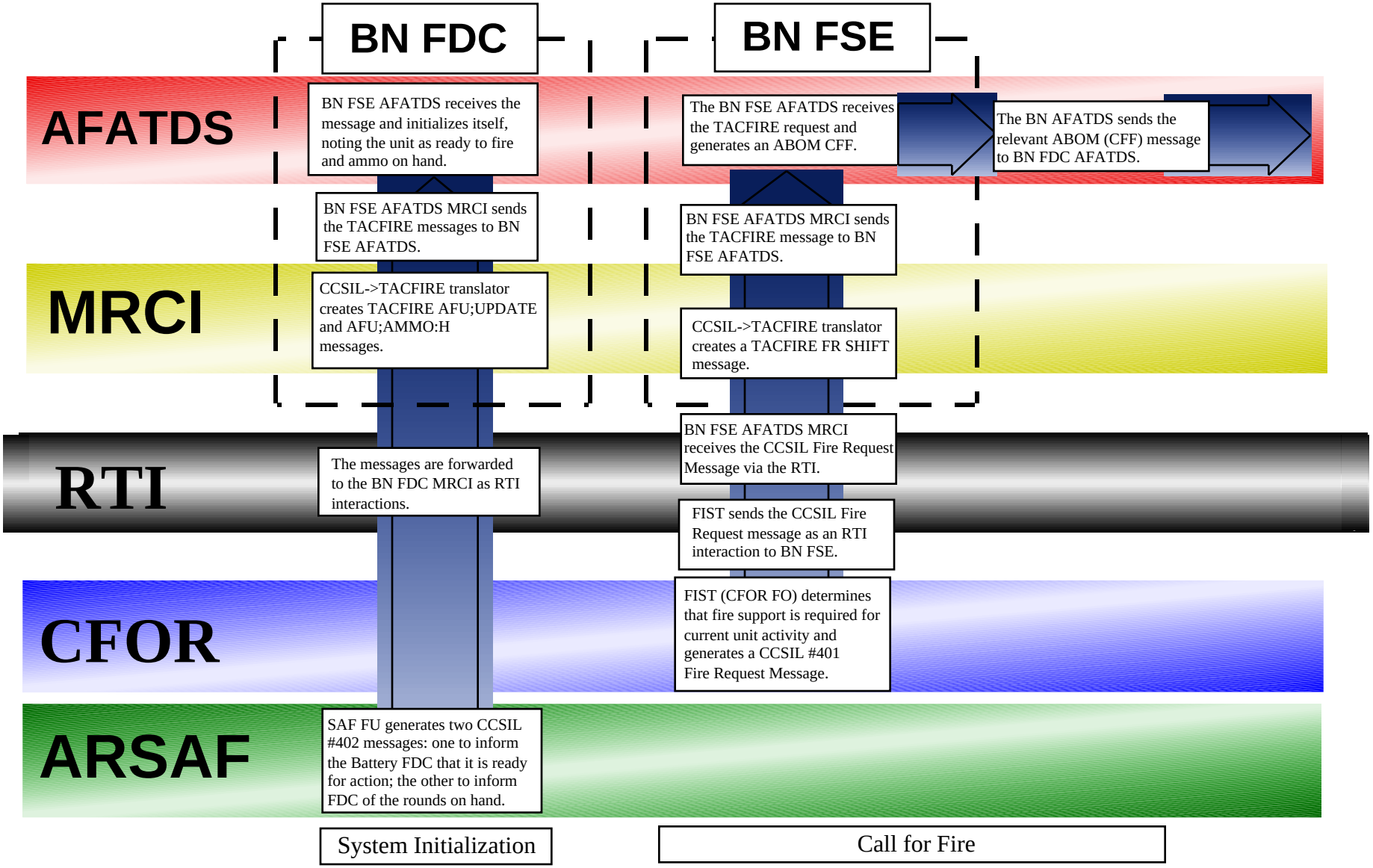
C4I Federate AFATDS (6 of 6)

Sequence of Activity

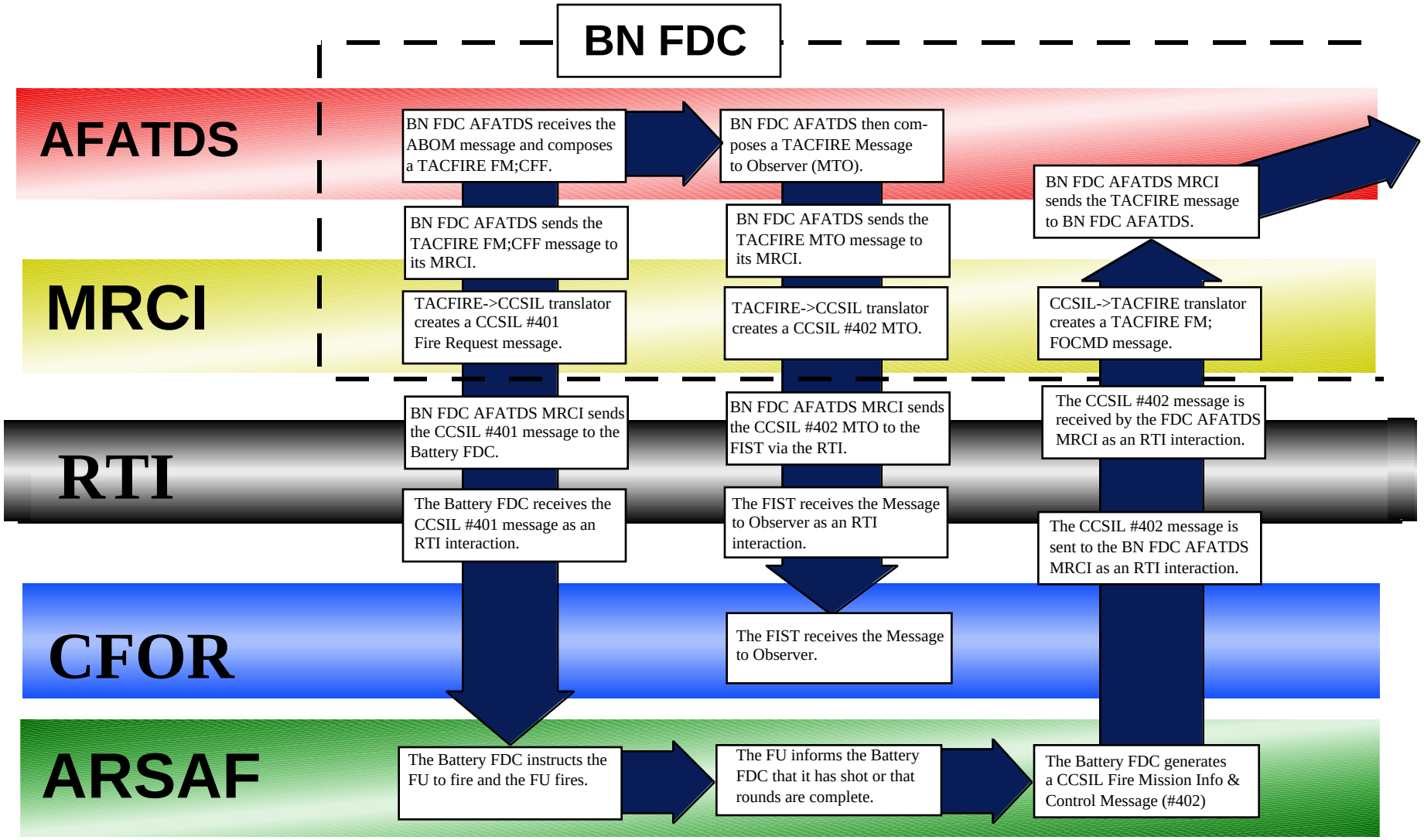
(Numbers correspond to numbered arrows on message interaction diagram)

1. Firing unit (FU) sets up and informs FDC they are ready to shoot
2. FU informs Fire Direction Center (FDC) of their round count by type of fuze, projectile, powder, etc
3. Forward Observer (FO) calls for fire
4. FDC sends the fire commands to the FU
5. FDC sends a Message to Observer informing him that the fire mission is working
6. FU informs FDC they have fired
7. FDC informs FO that guns have fired
8. FO reports effect on target and ends mission
9. FDC tells FU mission is over
10. FDC reports rounds expended to FDC

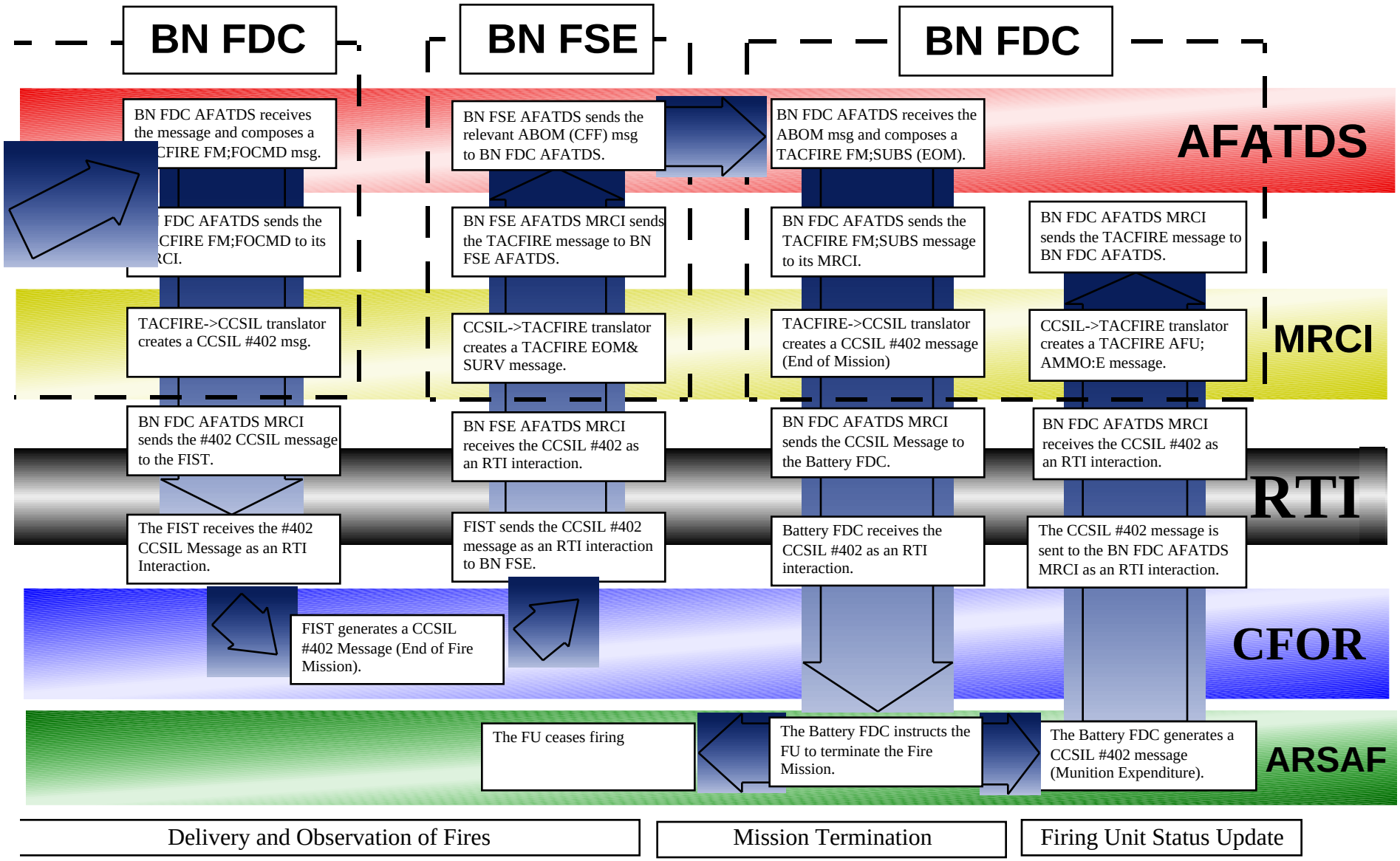
AFATDS - ARSAF Message Interaction (1)



AFATDS - ARSAF Message Interaction (2)



AFATDS - ARSAF Message Interaction (3)



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	- MRCI	Mark Cosby

Simulation Federate ARSAF (1 of 2)

- **Developer:** SAIC-Burlington for Command Entity Software (Logicon for Army Knowledge Acquisition)
- **Sponsoring Government Agency:** DARPA
- **Brief Description of Simulation:** ARSAF is an integration of ModSAF, the CFOR infrastructure and Command Entity Reasoner Software to add explicit, virtual representation of command nodes, command & control information exchange and command decision-making to the simulation of Army individual platforms and small units
- **For Use In MRCI Experiments:** STOW97
- **C4I Systems Interfaced To:** MCS/P & AFATDS
- **H/W & S/W Supported:** SGI & IRIX
- **Status:** The Automated Company Commander Command Entity has participated in STOW97 combined tests and is under continued enhancement. ARSAF is integrating the STOW RTI releases. Fire Support Entities are under development as is an Automated Battalion Commander Command Entity.

Simulation Federate ARSAF (2 of 2)

CCSIL Messages

Operations Order (#101)

Fragmentary Order (#102)

Execute Directive (#103)

Unit Situation Status (#201)

Unit Status Report (#202)

Report Request (#203)

Fire Request (#401)

Fire Mission Information & Control (#402)

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Simulation Federate
CCTT SAF (1 of 2)

- **Developer:** SAIC-Orlando under Lockheed-Martin Fed. Sys. Contract
- **Sponsoring Government Agency:** STRICOM
- **Brief Description of Simulation:** CCTT-SAF is an object-based SAF simulation developed under 2167A requirements. It is distinguished from ModSAF by its military-user oriented GUI and its extensive set of realistic unit behaviors that was developed from VV&Aed Combat Instruction Sets (CISs). It provides BLUFOR and OPFOR units from vehicles to battalions.
- **For Use In MRCI Experiments:** Testbed Utility
- **C4I Systems Interfaced To:** MCS/P Beta, MCS/P Baseline
- **H/W & S/W Supported:** IBM RS6000 / 43P & AIX
- **Status:** The MCS/P to CCTT-SAF prototype using the STOW A.1 RTI was demonstrated at I/ITSEC. Updated to use both CCSIL interactions and Signal interactions.

Simulation Federate CCTT-SAF (2 of 2)

MCS/P to CCTT-SAF Prototype Message Set

CCSIL

- Execute Directive (#103)
- Unit Situation Status (#201)

MCS/P (USMTF)

- FREETEXT Message
- Resource Report
- SALUTE

CCTT-SAF

- Start Mission (on-order)
- Resume Mission (on-order)
- Situation Report
- Spot Report

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	- COMM EFFECTS SERVER (CES)	**Aaron Steigerwald**
	- MRCI	**Mark Cosby**

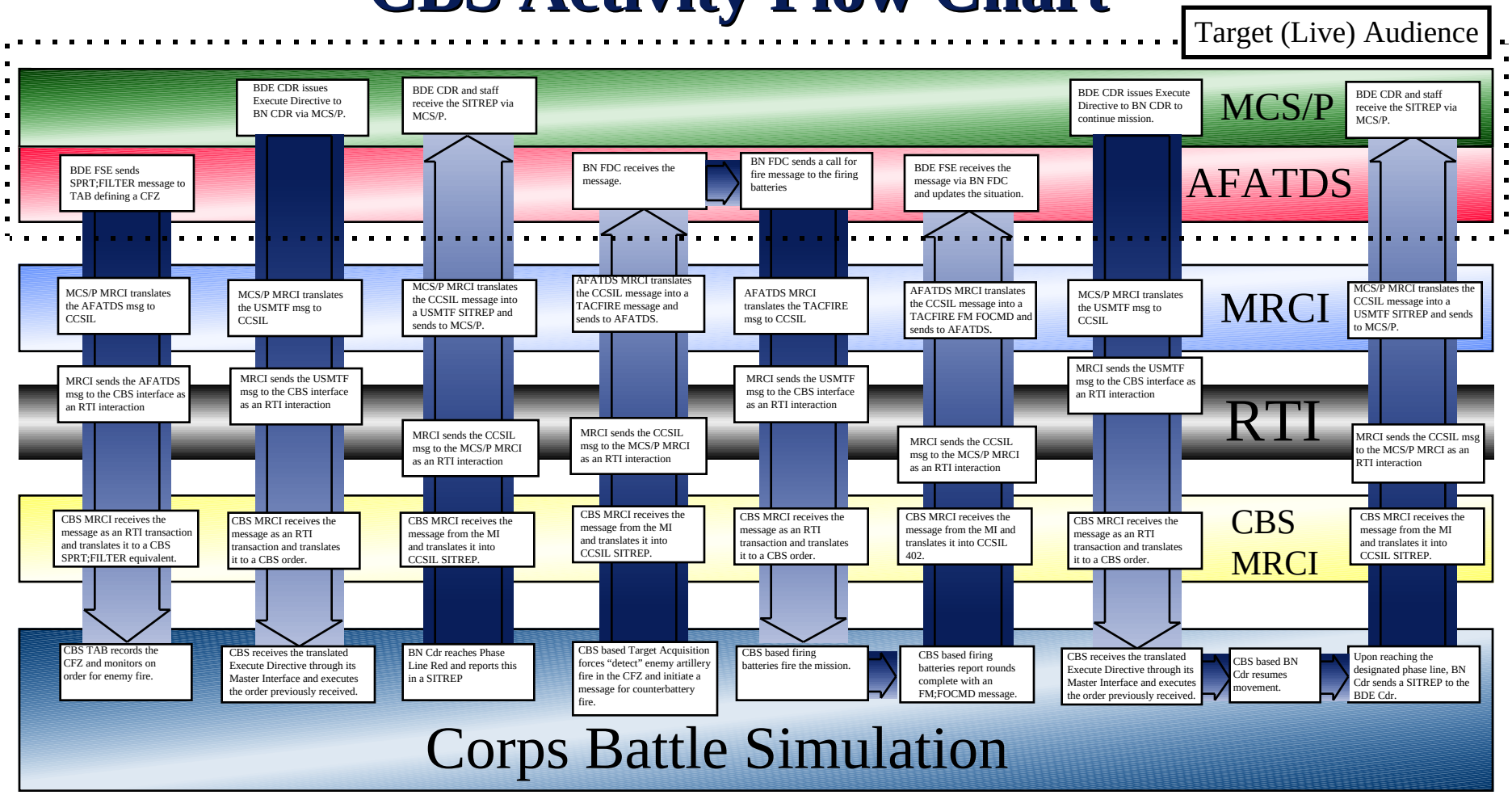
CBS Linkage
Purpose and Description

- **Purpose**: MRCI will link to the Corps Battle Simulation (CBS) to demonstrate the capability, via a simple proof-of-principle scenario, of MRCI to link C^{4}I systems to non-HLA simulations.
- **Description**: Two Advanced Field Artillery Tactical Data Systems (AFATDS) and one Maneuver Control System/Phoenix (MCS/P) will provide C^{4}I gateway services to enter scenario driven commands via the MRCI, to a CBS System Specific Interface (SSI) that will relay those commands directly to CBS through the Master Interface. Reports and data generated by CBS will be sent out the same way and relayed to the appropriate C^{4}I system.

CBS Linkage
Scenario

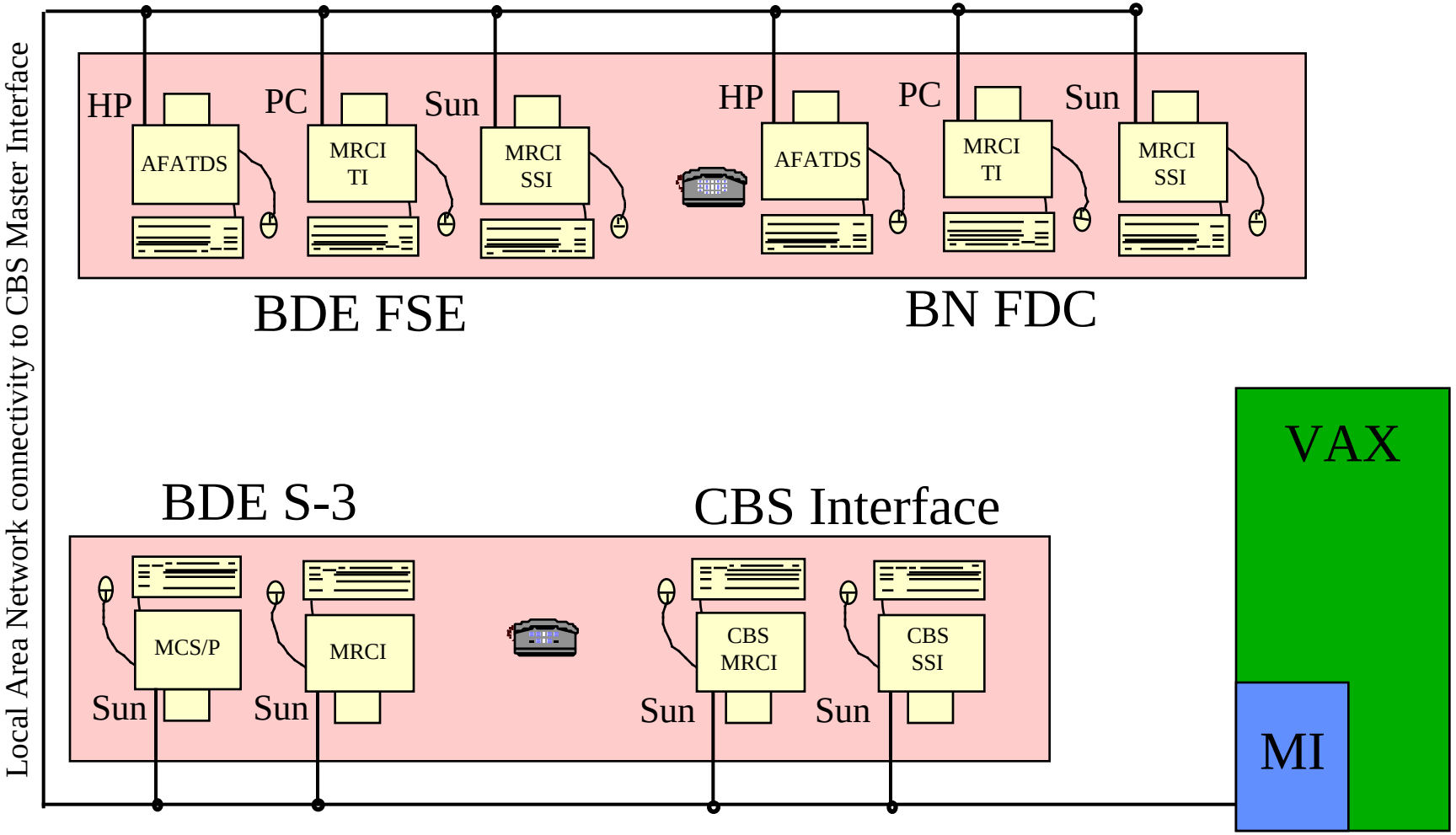
- BDE Cdr issues an execute directive to BN Cdr (CBS) to move out.
- BN Cdr sends SITREP to BDE Cdr that he is receiving fire.
- Target Acquisition (CBS) detects hostile artillery fire and relays information to BDE FSE.
- BDE FSE transmits a call for fire to the FA BN FDC.
- BN FDC sends fire mission to firing batteries (CBS).
- CBS fires the mission and reports back thru BN FDC to BDE FSE.
- BDE Cdr issues execute directive to BN Cdr to continue mission, report reaching Phase Line Blue.
- BN Cdr sends SITREP reporting reaching Phase Line Blue.

CBS Linkage
CBS Activity Flow Chart



MRCI Demonstration of Operational Capability - 19 February 1997

CBS Linkage
Physical Layout at CT97



CBS Linkage
Current Schedule

14 Feb	Completion of a prototype of the CBS-MRCI GUI and SSI in Germany
14 Feb	Development of scenario
25 Feb	Ship equipment to JTASC for CT97.
27 Feb	MRCI advance party to JTASC to install equipment.
4-7 Mar	CT97 participation by MRCI
8 Mar	Equipment packed/shipped from JTASC. Main Body departs JTASC.
30 Apr	Complete mapping of all messages for demo at Prairie Warrior 97

CBS Linkage
Status of Development

- CBS 1.5.4 is running at Warrior Prep Center (WPC) for our use in development work (as of 11 Feb)
- A prototype of the interface is operational at WPC
- Of 12 messages required for Prairie Warrior, 5 have been completed. The remaining 7 are TACFIRE/CBS messages.
- Of the messages required for CT97, all have been completed.

CBS Linkage
Message Implemention (by type)

- USMTF Frag Order to CCSIL 103 Execute Directive

- CCSIL 103 to CBS Order (equivalent)
- CCSIL 201 to USMTF SITREP
- CCSIL 401 to CBS CFF (equivalent)
- CCSIL 402 to TACFIRE FOCMD
- CCSIL 402 to TACFIRE FM;RFAF
- CCSIL 402 to CBS SPRT;FILTER (equivalent)

- CBS SITREP to CCSIL 201 SITREP
- CBS FM;RFAF to CCSIL 402
- CBS FOCMD to CCSIL 402

- TACFIRE CFF to CCSIL 401
- TACFIRE SPRT;FILTER to CCSIL 402

DOC Agenda (1 of 2)

Time	*Subject*	*Briefer*
0830-0840	**Welcome / Introductions**	**Mark Cosby**
0840-1040	**Status of Experimental Federation Elements**	
	- RTI F.0	**Mike Hieb**
	- RTI S.X	**Mike Hieb**
	- C4I/CTAPS	**Bill Bretton**
	- SIM/AFSAF	**Mike Hieb**
	- C4I/MCS/P Baseline	**Bob Howard**
	- C4I/AFATDS	**Dale Anglin**
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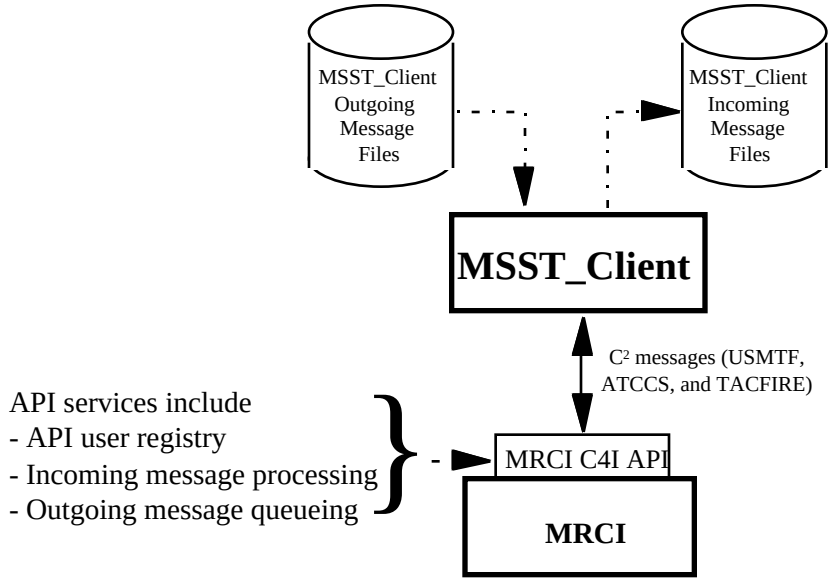
	- MRCI	**Mark Cosby**

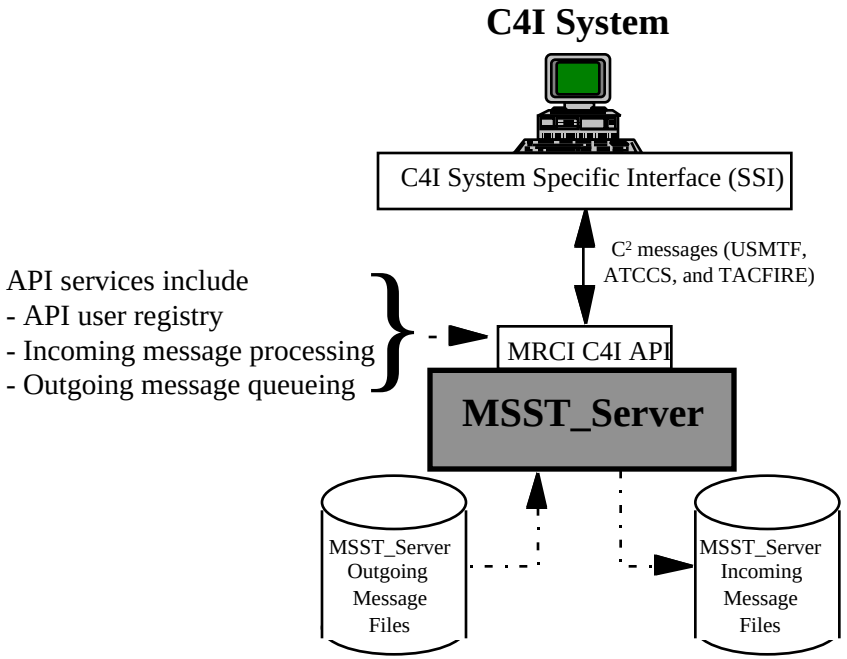
MRCI Test Tools (1 of 3)

- MRCI System Stimulation (MSST) Client



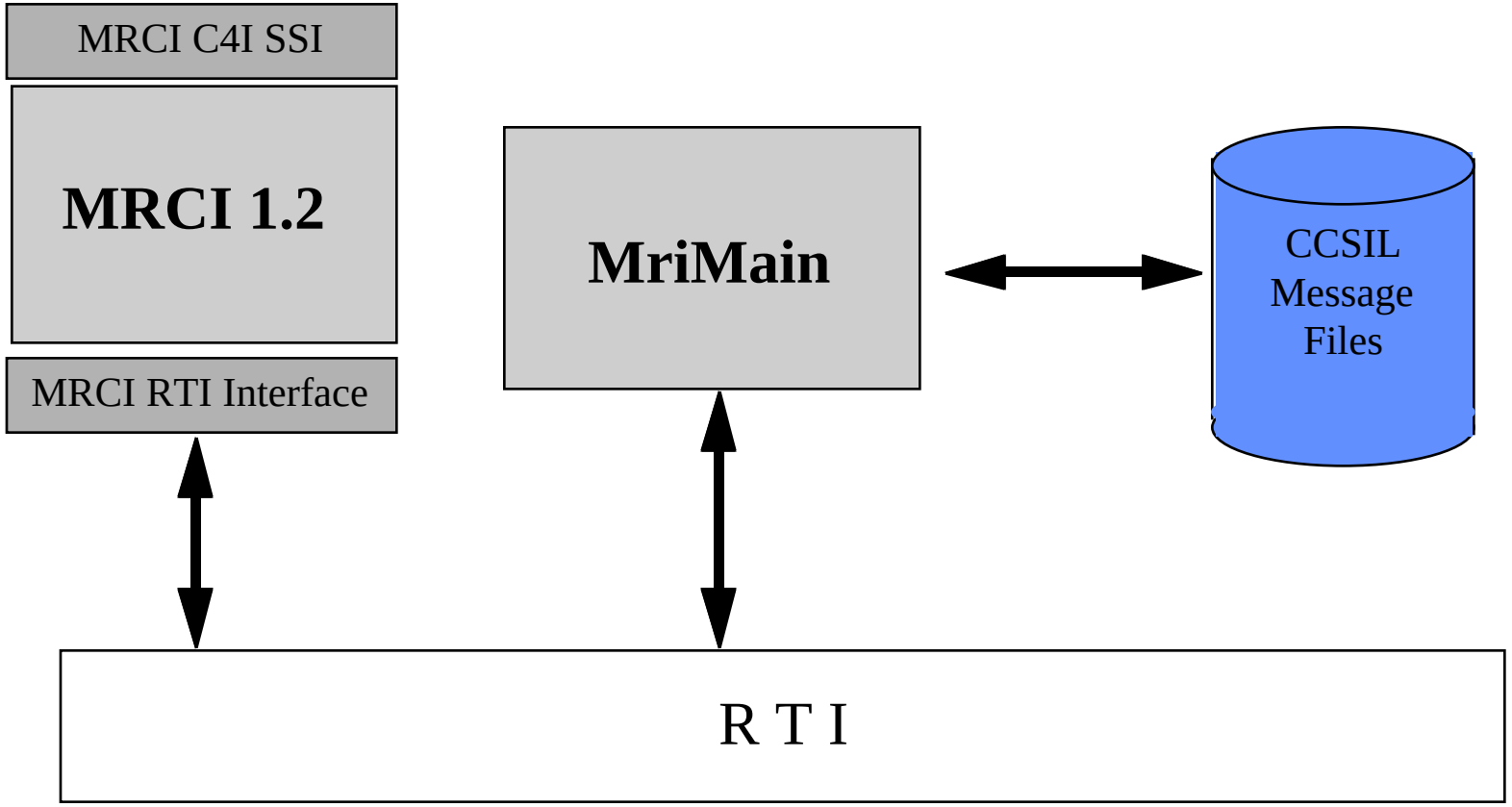
MRCI Test Tools (2 of 3)

- MRCI System Stimulation (MSST) Server



MRCI Test Tools (3 of 3)

- RTI Test Tool (MriMain)



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	- *COMM EFFECTS SERVER (CES)*	*Aaron Steigerwald*
	- MRCI	Mark Cosby

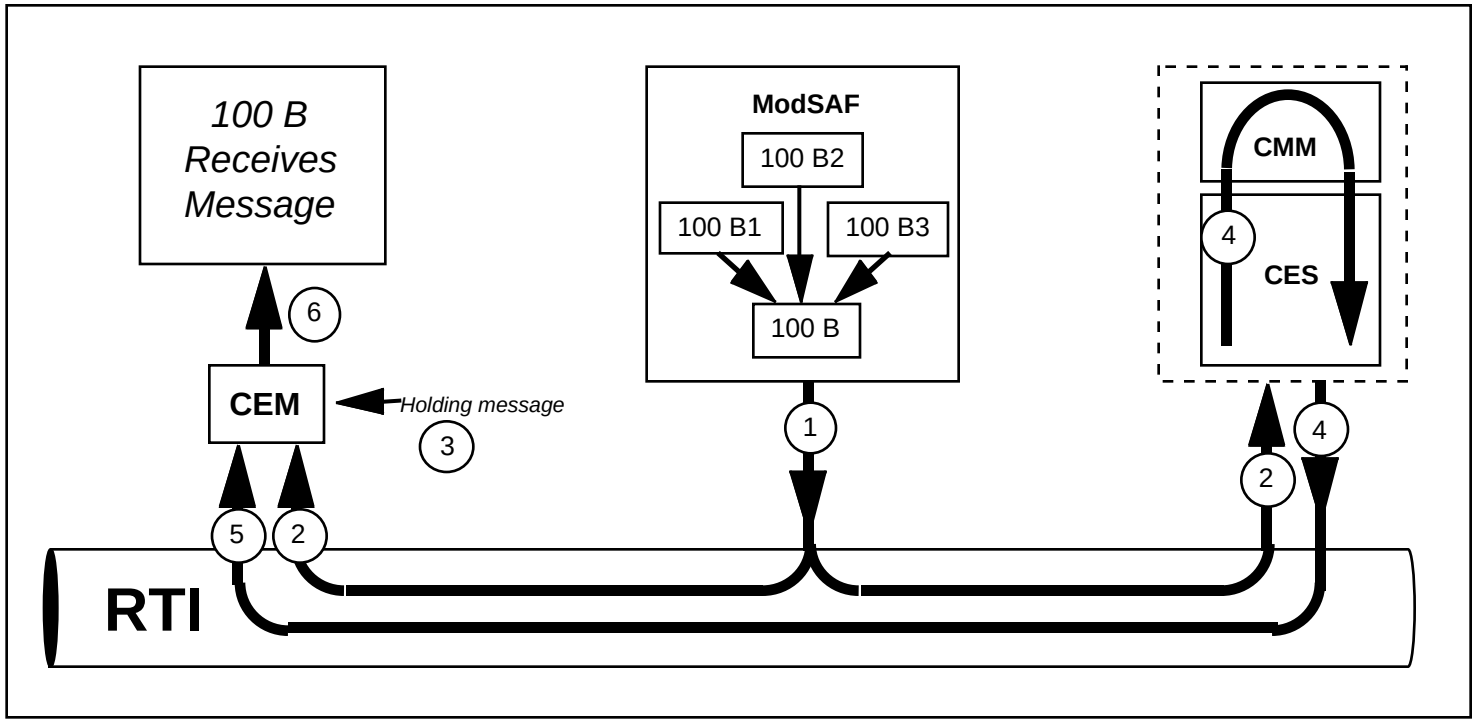
Automated Communications Effects Server System (ACESS) (1 of 3)

- **Developer**: SAIC and MITRE
- **Sponsoring Government Agency**: DMSO (as part of the MRCI project)
- **Brief Description of System**: The ACESS provides the ability to emulate tactical data communications in real time. This is accomplished with two components: the Communications Effects Module (CEM) and the Communications Effects Server. The CES delivers communications degradation parameters to the CEM where they are applied to messages.
- **For Use in MRCI Experiments**: All present and future
- **C4I Systems Interfaced to**: All
- **H/W and S/W Supported**: SPARC 20 and SPARC Ultra, Solaris 2.5

Automated Communications Effects Server System (ACESS) (2 of 3)

- **Status**:
  - The ACESS design has been finalized.
  - The CES-Communications Modeling Module (CMM) Interface Control Document (ICD) alpha version is complete.
  - The proof of concept version 1 is complete, whereby message receipt is based on sender-receiver transmitter settings and CES generated Latency Times (LTs).
  - The proof of concept version 2 is under development, whereby maximum LT matrices are periodically generated by the CES and applied at the CEM.

Automated Communications Effects Server System (ACESS) (3 of 3)



1) Message Interactions are sent via the RTI.
2) Message Interactions are received by both the CES and the CEM.
3) The CEM holds the message.
4) The CES passes message parameters to the CMM The CMM generates an LT value and sends it back to the CES. The CES then sends the LT to the CEM as an LT Interaction via the RTI.
5) The CEM receives the LT Interaction.
6) The CEM releases the message when either the LT value expires or a static time expires (e.g. 5 seconds).

DOC Agenda (1 of 2)

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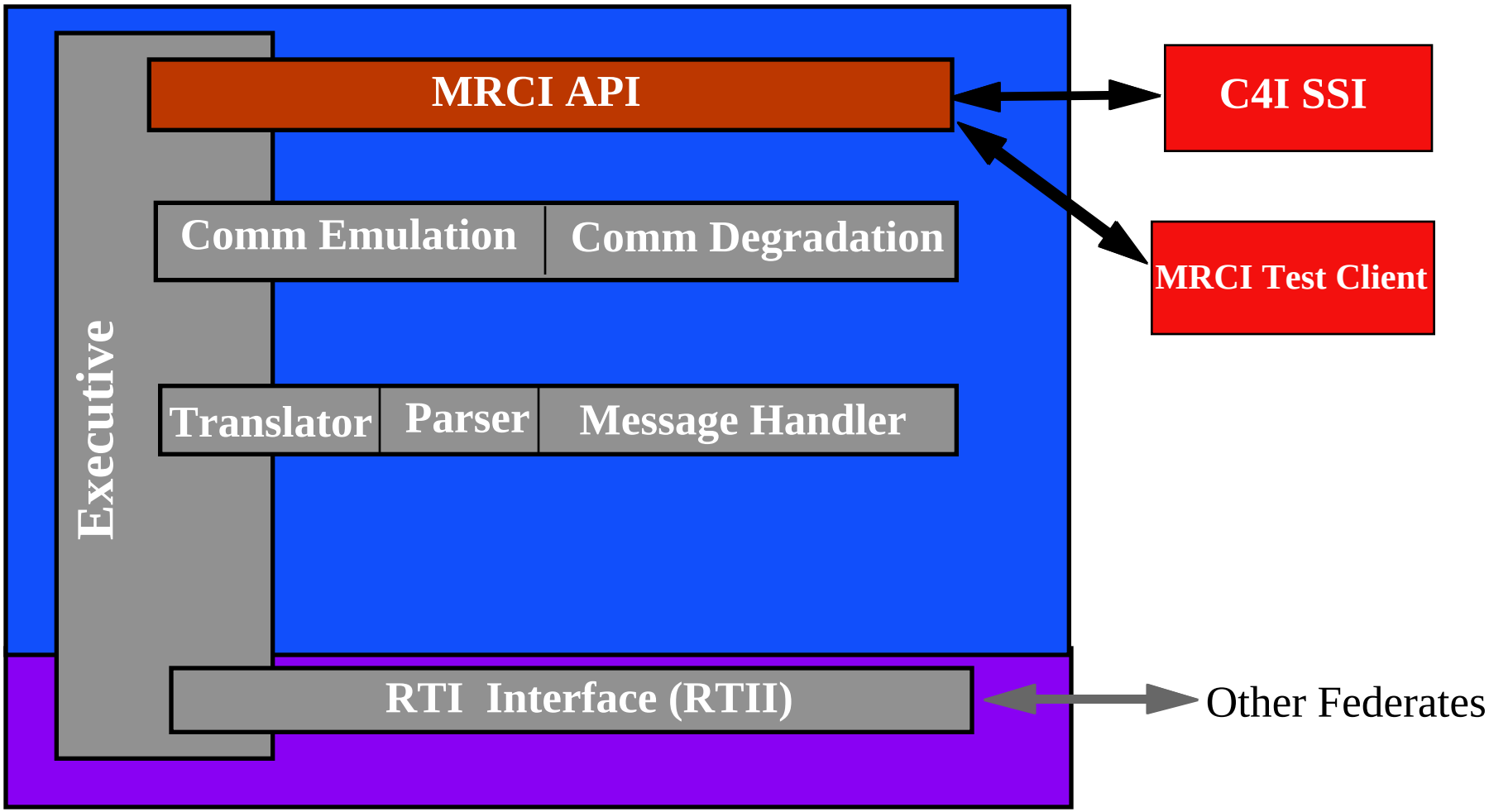
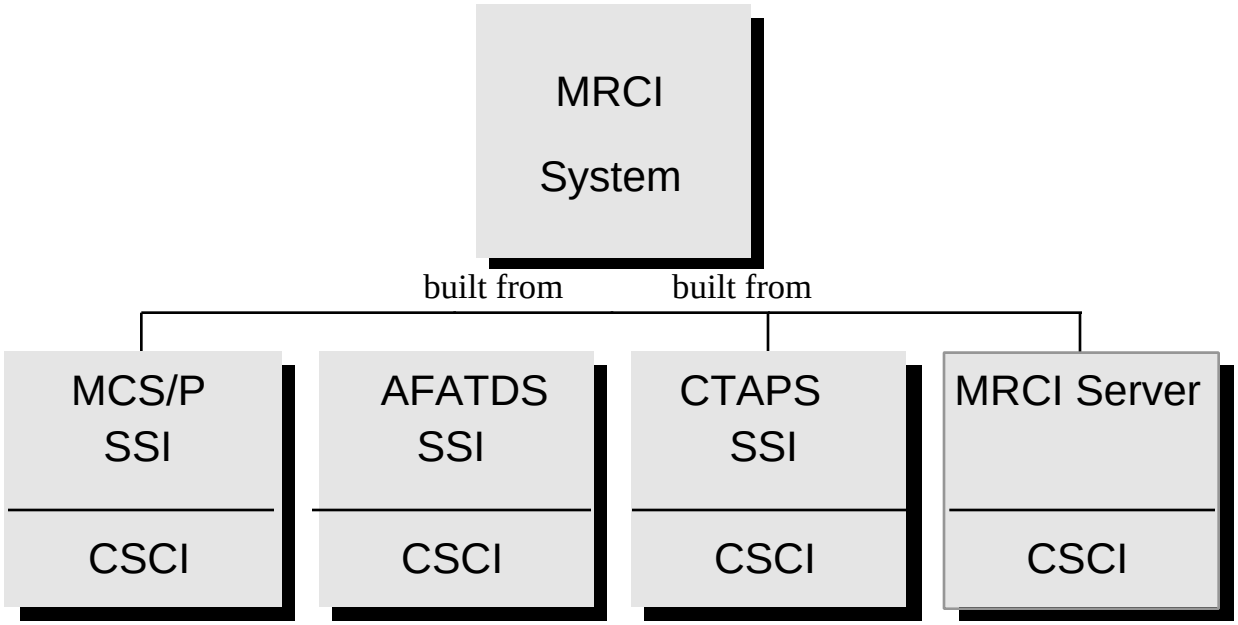
	- MRCI	***Mark Cosby***

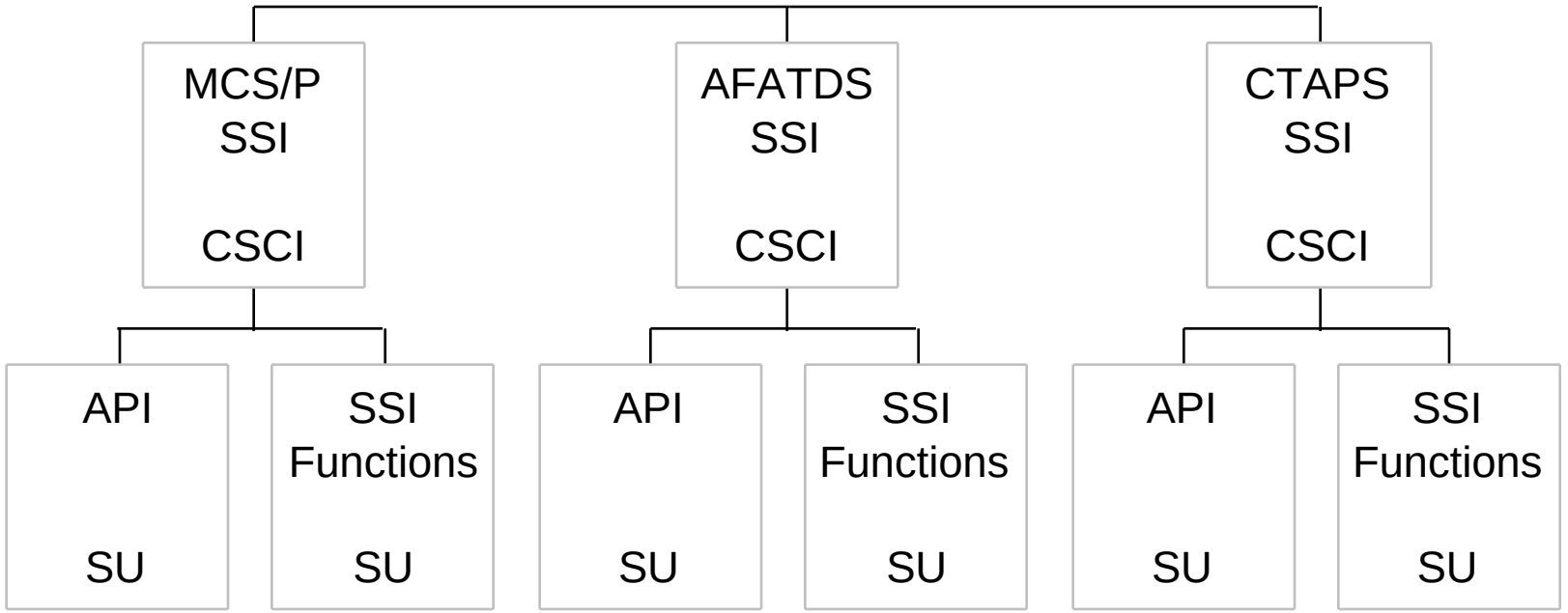
MRCI Design (1 of 4)



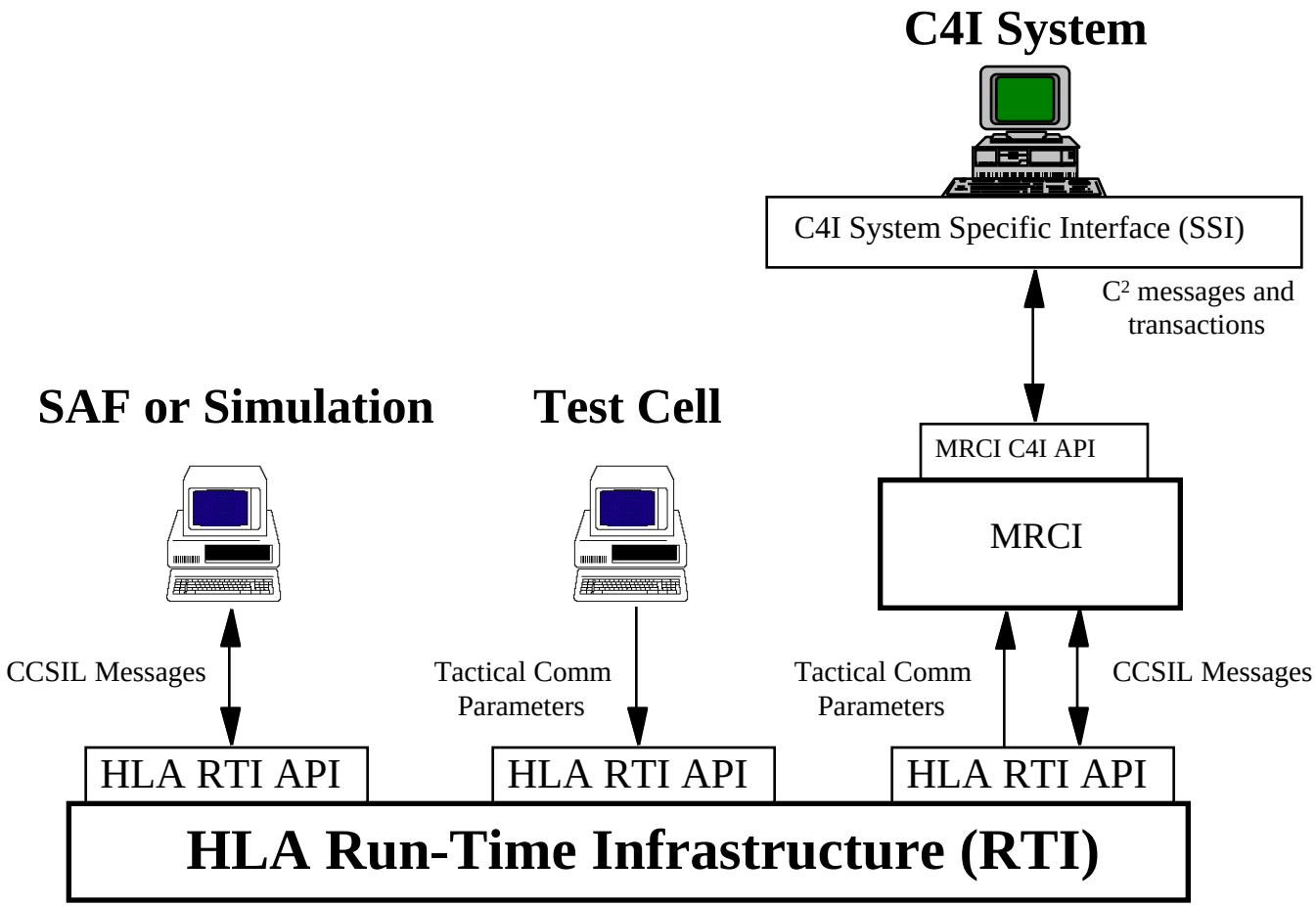
MRCI Design (2 of 4)



MRCI Design (3 of 4)



MRCI Design (4 of 4)



DOC Agenda (2 of 2)

Time	*Subject*	*Briefer*
1040-1050	***Break***	
1050-1150	**Demonstration of MRCI Operational Capability**	**Larry Griggs Mike Hieb**
	- CTAPS, MCS/P, AFATDS, ARSAF,CCTT TEST TOOLS, CES	
1150-1205	**Inter-Program Activities Status**	
	- STOW	**John Zwirner**
	- JSIMS	**Mike Lightner**
	- JTC	**Laura Feinerman**
1205-1225	**MRCI Software Quality Factors**	
	- Overview of Quality Factors	**Larry Griggs**
	- Emphasis on Reusability	**Mike Hieb**
1225-1230	**IPR Overview**	**John Park**
1230	**Adjourn**	

DOC Agenda (2 of 2)

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MRCI DOC Demonstration (1 of 7)

- Simulations
  - ARSAF (ModSAF 97Beta w/CFOR 3.0b)
  - CCTT
- C4I Systems:
  - AFATDS 1.0.06
  - MCS/P Baseline 12.01
  - CTAPS 5.1.3
- Scenario
  - US Army mechanized infantry battalion in meeting engagement with OPFOR reconnaissance element in Twentynine Palms, CA OPAREA
- MRCI Components Demonstrated
  - System Specific Interfaces
    - AFATDS 1.0.06
    - MCS/P Baseline 12.01
    - CTAPS 5.1.3

MRCI DOC Demonstration (2 of 7)

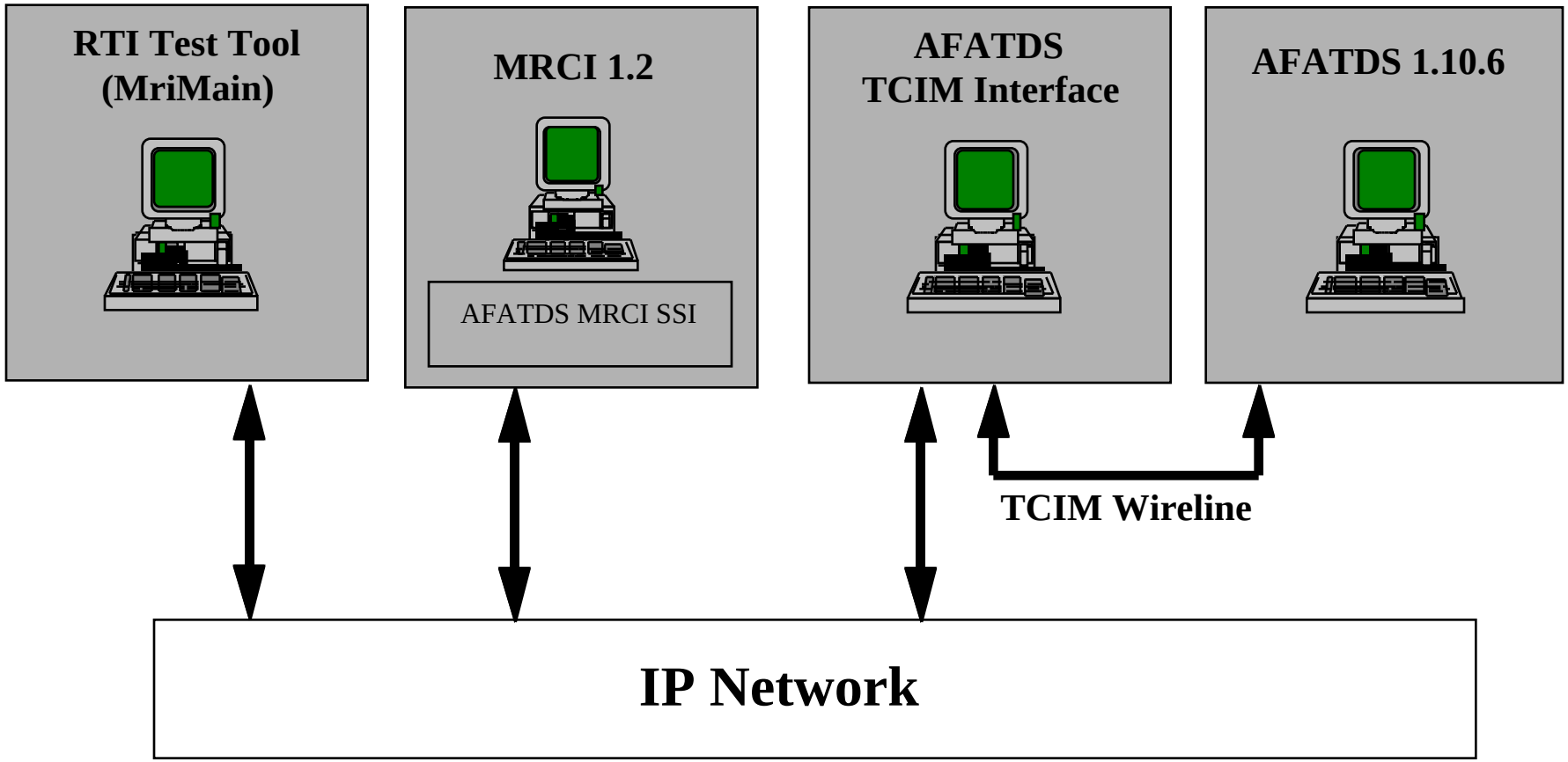
- MRCI Components Demonstrated, cont'd
  - Common Modules
    - Executive
    - Translator
    - Message Handler
    - Communications
  - RTI Interface Module
- Demonstration "Events"
  - AFATDS Demonstration
    - MSST 1.2 (file-based MRCI)
    - AFATDS MRCI SSI
    - AFATDS MRCI TCIM Interface
    - AFATDS

MRCI DOC Demonstration (3 of 7)

- CTAPS Demonstration
  - RTI Test Tool (MriMain)
  - MRCI 1.2
  - CTAPS SSI
  - CTAPS 5.1.3
- MCS/P SSI Demonstration #1
  - ARSAF
  - MRCI 1.2
  - MCS/P SSI
  - MCS/P
- MCS/P SSI Demonstration #2
  - CCTT
  - MRCI 1.2
  - MCS/P SSI
  - MCS/P

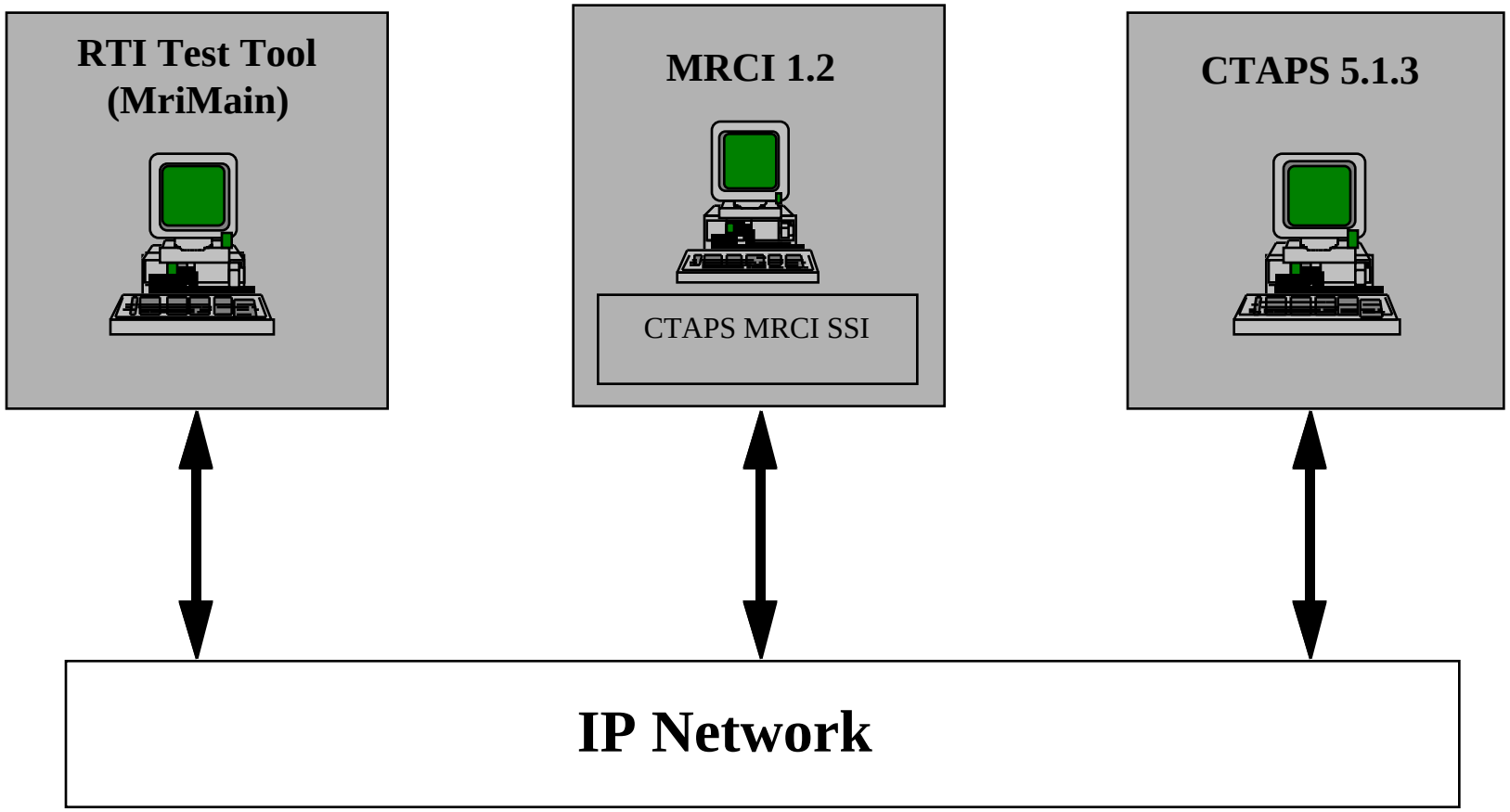
MRCI DOC Demonstration (4 of 7)

AFATDS Demonstration



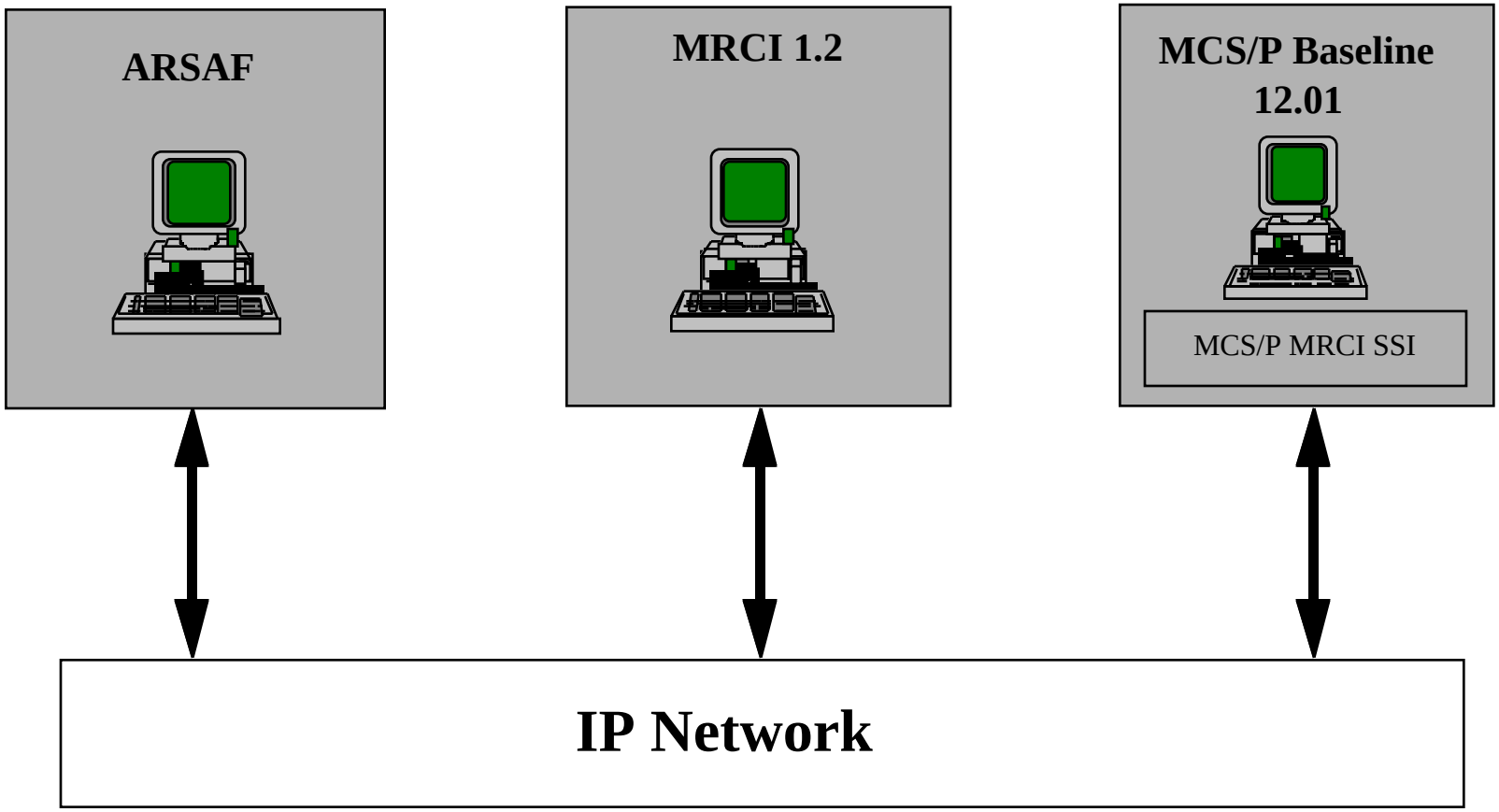
MRCI DOC Demonstration (5 of 7)

CTAPS Demonstration



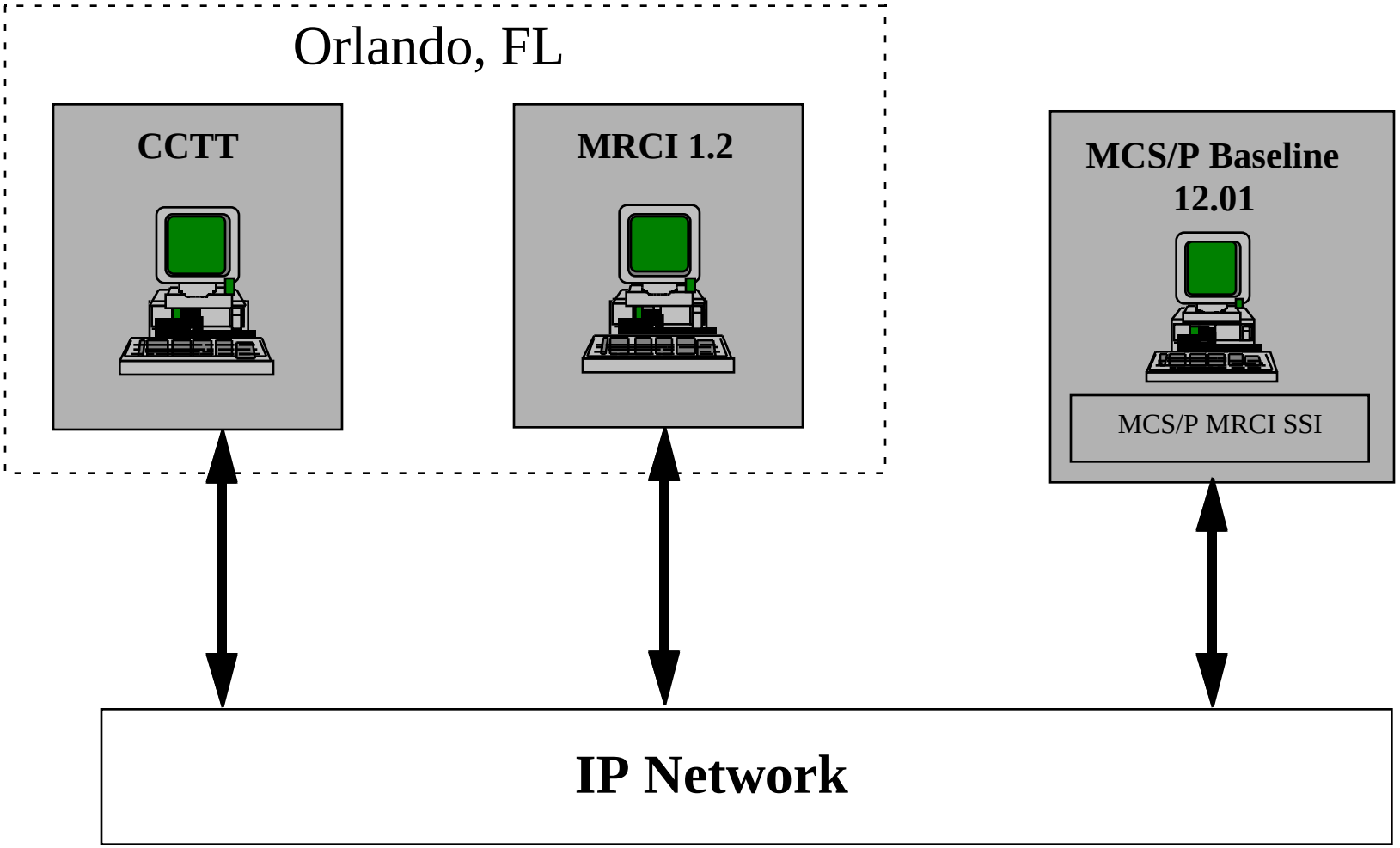
MRCI DOC Demonstration (6 of 7)

MCS/P - ARSAF Demonstration



MRCI DOC Demonstration (7 of 7)

MCS/P - CCTT Demonstration



DOC Agenda (2 of 2)

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Software Quality Factors

- **Software Quality Definition**
  - "The ability of software to meet its specified requirements." (MIL-STD-498 - Software Development and Documentation)

- **Software Quality Factors**
  - commonly referred to as "…ilities" to distinguish them from performance requirements

- **Key Software Quality Factors *(as enumerated and defined in MIL-STD-498 Software Requirements Specification (SRS) data item description (DID))***
  - Functionality: ability to perform all required functions
  - Reliability: ability to perform with correct, consistent results
  - Maintainability: ability to be easily corrected
  - Availability: ability to be accessed and operated when needed
  - Flexibility: ability to be easily adapted to changing requirements
  - Portability: ability to be easily modified for a new environment
  - Reusability: ability to be used in multiple applications
  - Testability: ability to be easily and thoroughly tested
  - Useability: ability to be easily learned and used

MRCI Software Quality Requirements (1 of 2)

- **Functionality: ability to perform all required functions**
  - #41: MRCI must provide functionality compatible with the STOW SSF and data collection facilities in support of STOW FOMs
- **Reliability: ability to perform with correct, consistent results**
- **Maintainability: ability to be easily corrected**
  - #28: MRCI shall minimize life-cycle costs and be logistically supportable
  - #36: The design of MRCI shall not preclude the addition of a module to support direct C4I system database access (vice message interchange) when specified in future C4I SOMs.
- **Availability: ability to be accessed and operated when needed**
- **Flexibility: ability to be easily adapted to changing requirements**
  - #29: MRCI shall be flexible, extensible, and modifiable to capitalize on current and emerging industry accepted standards and commercially available products to the maximum extent possible to support the system requiremetns and to streamline upgrades
  - #30: MRCI shall provide sufficient flexibility, modifiability and performance to support changes and extensions to the interfaces on both the C4I and RTI sides

MRCI Software Quality Requirements (2 of 2)

- **Portability: ability to be easily modified for a new environment**
  - #5: MRCI shall support C4I systems representing echelons above Corps to platform level, e.g., infantryman operating autonomously
  - #18: MRCI shall support next generation releases of C4I system software (e.g., MCS/P Baseline Build V, Block III; AFATDS V 1.0.06)
  - #32: MRCI software shall be portable to different vendor host platforms with minimal or no modifications
  - #34.1: MRCI shall provide the capability to be used with next generation simulations and the Prototype Federation products

- **Reusability: ability to be used in multiple applications**
  - #20: To the extent practical, MRCI re-configurable modules shall be resuable among instances of C4I-MRCI combinations

- **Testability: ability to be easily and thoroughly tested**
- **Usability: ability to be easily learned and used**
  - #27: MRCI shall reduce the number of, and special training required for, system adminstrators, network administrators, and other exercise support personnel

Reusability of MRCI

Multiple Dimensions:

- **Level 1 (to Mil Standards)**
  - Able to be used without modification of software for other C4I Federates.
  - Able to be used within new Federations via reconfiguration
  - Reconfiguration is via flat files (read in at initialization)

- **Level 2 (Software Design)**
  - Modularity of Major Components (Common Modules and RTI Interface)
  - API for development of new System Specific Interfaces for C4I Federates
  - Specification of future software development needs

- **Level 3 (Lifecycle Methodology)**
  - Documentation Requirements
  - Infrastructure of Test & Message Development Tools
  - Integration of SOM & FOM Methodology

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IPR Overview

- **IPR Content**
  - **Review of Baseline MRCI Design for As-Built State**
  - **Assessment of Level of Compliance of Design with Requirements as Specified at SRR and PDR**
  - **Assessment of Level of Compliance of Implementation with Requirements as Specified at SRR and PDR**
  - **Expanded Demonstration of Experimental Federations Using MRCI 1.3**
    - **TACFIRE-CCSIL Upgrade**
    - **Use of STOW RTI B**
    - **Expanded Message Sets**
    - **Expanded Use of SAFs as Federates**
    - **Expanded Prototype of Communications Emulation/Degradation with an Operating Communications Effects Model from CECOM**
    - **CBS Demonstration**

DOC Agenda (2 of 2)

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